Chapter 11
Regional and Agricultural Economics

Regional economies are local systems of producing, delivering, and trading goods and services. Agriculture in the Environmental Water Account (EWA) area of analysis is an important element of the local economy. Regional and agricultural economics is concerned with the net effect of all EWA actions on local economies, including agriculture. Economic indicators addressed in this chapter include agricultural net returns, total output, value added, wages and salaries, and employment.

This chapter describes the economic situation in the EWA area of analysis, the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) issues, and the economic effects of the No Action/No Project Alternative, the Fixed Purchase Alternative and the Flexible Purchase Alternative.

11.1 Affected Environment/Existing Conditions

The Affected Environment/Existing Conditions section presents recent data related to the economic conditions of the subject areas. First, data are provided for those areas with regional economies affected by crop idling for water transfers. This section presents most data at the county level because data regarding regional and agricultural economics area descriptions are generally available by county. The description of the affected environment does not include the Delta and Southern California portions of the Export Service Area, in which regional agricultural economic effects from EWA crop idling would be unlikely.

Next, this section provides background data related to other economic issues, such as county tax revenue generated by the Williamson Act, agricultural groundwater extraction costs, and water transfer market effects.

11.1.1 Area of Analysis

The Regional and Agricultural Economics area of analysis includes counties in which EWA could acquire water through crop idling. Crop idling would temporarily reduce agricultural production, which could result in regional economic effects. The Upstream from the Delta Region includes Butte, Colusa, Glenn, Placer, Sutter, and Yolo Counties. The Export Service Area includes Fresno, Kern, Kings, and Tulare Counties. The boundaries of each county in each region define the Upstream from the Delta Region and the Export Service Area.

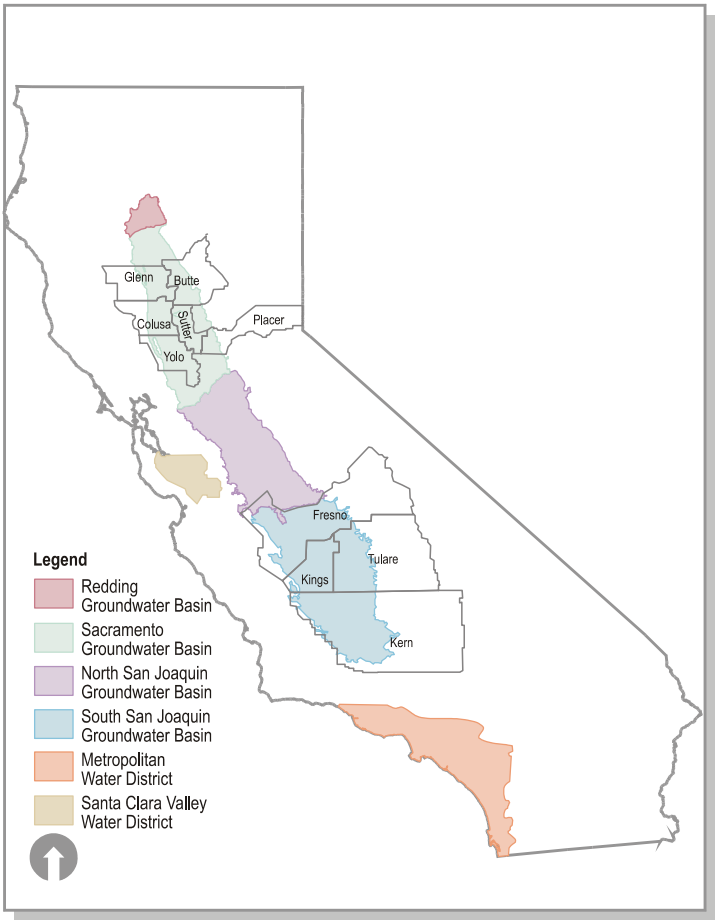

Figure 11-1
Regional and Agricultural Economics Area of Analysis

Agricultural business losses and related effects that could be caused by crop idling would occur in the counties where the EWA agencies purchase water through crop idling. The regional and agricultural economics area of analysis also includes the groundwater resources area of analysis, which extends from the City of Redding in the northern portion of the Sacramento Valley to Kern County in the southern portion of the San Joaquin Valley, because groundwater substitution could increase groundwater extraction costs. The potential for water transfer market effects would be relevant to all EWA regions across California. Figure 11-1 shows the complete area of analysis.

11.1.2 Upstream from the Delta Region

Potentially affected counties in the Upstream from the Delta Region are Butte, Colusa, Sutter, Placer, Glenn, and Yolo Counties. The subsections below first present regional economic data, then economic settings in each potentially affected county within the region. Figure 11-2 displays the Upstream from the Delta Region. Sacramento County is included for reference purposes; Yuba County is included because regional effects of rice idling may affect Yuba County rice-related businesses. Refer to Section 11.2.5.1 for further discussion.

11.1.2.1 Regional Economics

Regional economics data are taken directly from the Bureau of Economic Analysis (BEA) Regional Economic Information System (REIS) 2000. Table 11-1 shows estimated industry earnings and employment for potentially affected counties in the Upstream from the Delta Region. The region's population in 1999 was approximately 773,000, an increase from 665,000 in 1990. In 1999, the Upstream from the Delta Region employed approximately 434,000 people (BEA REIS 2000). Primary employers were services, government, retail trade, and the finance, insurance and real estate sectors. Over time, agriculture, mining, and manufacturing's share of economic

activity in the region has decreased (BEA REIS 2000). This trend is expected to continue in the future.

In Table 11-1, total earnings include wage and salary disbursements, other labor income, and proprietor's net income. In 1999, the largest contributors to total earnings were services, government, and retail trade, at approximately 23.7 percent, 22.5 percent, and 12.4 percent, respectively (BEA REIS 2000). Agriculture, forestry, and fishing provided 1.5 percent, approximately $190 million, of the region's total earnings, yet the percentage varied widely among the counties. In 1999, agriculture contributed 6.6 percent of total earnings in Glenn County, 3.8 percent in Sutter County and 2.6 percent in Yuba County (BEA REIS 2000). These counties have relatively small urban areas and large percentages of their acreage devoted to farmland.

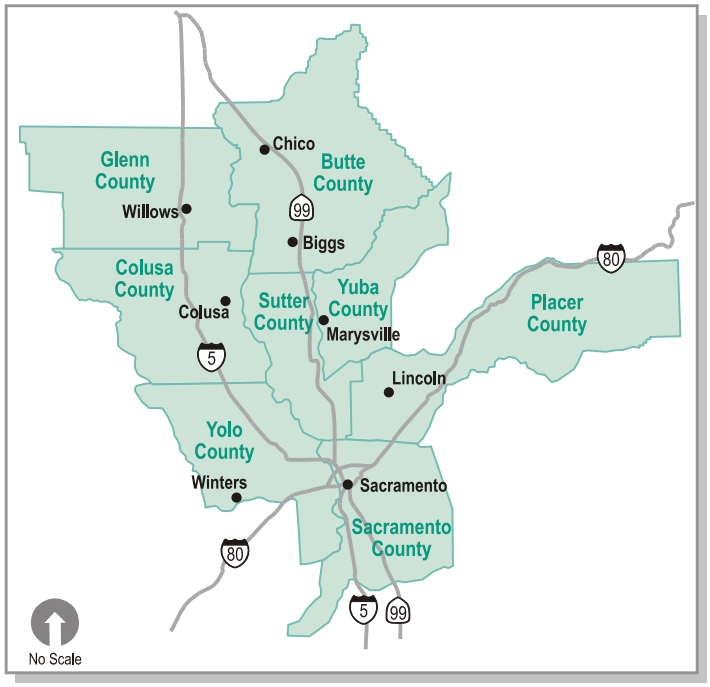

Figure 11-2
Counties in the Upstream from the Delta Region

Table 11-1
1999 Total Industry Earnings and Employment Upstream from the Delta Region [(1)]

	1999 Total Industry Earnings ($1,000)	*1999 Total Industry Employment (jobs)*
Total	$12,674,710	360,183
Agriculture, Forestry, Fishing	$190,403	8,828
Mining	$24,253	695
Construction	$1,140,331	28,749
Manufacturing	$1,544,633	33,288
Transportation, Comm., Utilities	$889,127	19,222
Wholesale Trade	$685,689	17,287
Retail Trade	$1,571,883	75,781
Finance, Insurance, Real Estate	$765,349	31,508
Services	$3,011,758	73,470
Govt. Enterprise & Special Industry	$2,851,284	71,355

Source: 1999 Bureau of Economic Analysis (BEA) Regional Economic Information System (REIS) Data, Published 2000

(1) Data for Butte, Colusa, Sutter, Placer, Glenn, Yuba, and Yolo Counties, except where noted below. Regional Economic Information System (REIS) data did not include some county estimates to avoid disclosure of confidential information in both industry earnings and employment. Butte estimates are not included in agriculture, forestry and fishing, and mining sectors. Colusa estimates are not included in agriculture, forestry and fishing, and services sectors.

Total personal income is total earnings, adjusted for place of residence,[1] plus dividends, interest and rent, and transfer payments received by the residents. In 1999, total personal income in the region was about $20.7 billion. Total farm personal income in the region was about $552 million (BEA REIS 2000). Table 11-2 shows a summary of economic activity by county in the Upstream from the Delta Region.

Table 11-2
1999 Economic Activity Upstream from the Delta Region $1,000

	Personal Income[1]				Total Industry Earnings[3]	Total Employment[4] (jobs)	Total Population (persons)
County	Total	Non-Farm	Farm	Per Capita (dollars)[2]			
Butte	$4,297,201	$4,247,290	$49,911	$22,012	$2,488,069	98,967	195,220
Colusa	$435,022	$320,040	$114,982	$23,085	$311,180	11,143	18,844
Glenn	$474,298	$448,015	$26,283	$18,015	$291,249	12,406	26,328
Placer	$8,375,356	$8,369,585	$5,771	$34,972	$4,663,985	139,088	239,485
Sutter	$1,899,637	$1,756,224	$143,413	$24,223	$1,039,337	39,474	78,423
Yolo	$4,206,288	$4,047,267	$159,021	$27,037	$3,741,271	107,331	155,573
Yuba	$1,042,211	$1,019,004	$23,207	$17,485	$767,182	25,725	59,607
Total	$20,730,013	$20,207,425	$522,588		$13,302,273	434,134	773,480

Source: 1999 BEA REIS Data, Published 2000

(1) Personal income is the income that is received by persons from participation in production, from both government and business transfer payments, and from government interest

(2) Per capita personal income is measure of income is calculated as the total personal income of the residents of an area divided by the population of the area. Per capita personal income is often used as an indicator of the economic well-being of the residents of an area.

(3) Total industry earnings include all farm and non-farm earnings.

(4) Total employment includes all industry sector employment estimates of both full and part-time jobs.

11.1.2.2 Agricultural Economics

Numbers and sizes of farms, together with ownership patterns, cropping patterns, production characteristics, and expense characteristics, are used to describe the general structure of agriculture in the region. Table 11-3 provides data on number of farms, land in farms, and amount of cropland for counties in the Upstream from the Delta Region, taken from the United States Department of Agriculture (USDA) Census of Agriculture.

Ownership patterns describe the number of farm owners who live within a region. In 1997, full owners operated about 65 percent of farms or approximately 5,150 farms, and part owners or tenants operated the remaining farms in the counties in the Upstream from the Delta Region (USDA 1999).[2]

In 1997, the average farm size in counties in the Upstream from the Delta Region was 347 acres (USDA 1999).[3] In 1997, the region supported about 1.7 million acres of total cropland, of which 1.4 million acres were irrigated land (USDA 1999).

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1 The place of residence of individuals is the State and county in which they live.

2 Full owners operated only land they owned. Part owners operated land they owned and also land they rented from others. Tenants operated only land they rented from others or worked on shares for others.

3 USDA data provided assumes the Census Bureau's most recent definition of a farm, being any place from which $1,000 or more of agricultural products were produced or sold, or normally would have been sold during the census year (USDA 1999).

Table 11-3
Farms, Land in Farms and Cropland Profiles of Counties Upstream from the Delta Region, 1997

County	Number of Farms	Land in Farms[1] (acres)	Avg. Size of Farm[2] (acres)	Total Cropland[3]		Harvested Cropland[4]		Irrigated Land[5]	
				Farms[6]	Acres	Farms	Acres	Farms	Acres
Butte	1,942	404,166	208	1,750	247,368	1,646	222,209	1,686	223,690
Colusa	810	430,958	532	759	316,756	722	287,630	723	276,562
Glenn	1,189	482,583	406	1,070	255,968	916	212,848	1,025	220,235
Placer	997	139,597	140	629	62,284	388	28,431	703	34,754
Sutter	1,314	348,349	265	1,259	297,107	1,203	266,399	1,199	242,183
Yolo	923	536,595	581	832	380,700	747	324,291	709	294,021
Yuba	706	208,462	295	548	96,989	426	79,586	556	85,241
Total	7,881	2,550,710	347	6,847	1,657,172	6,048	1,421,394	6,601	1,376,686

Source: 1997 United States Department of Agriculture (USDA) Agricultural Census Data Published 1999

(1) The acreage designated as "land in farms" consists primarily of agricultural land used for crops, pasture, or grazing. All grazing land, except land used under government permits on a per-head basis, was included as " land in farms" provided it was part of a farm or ranch.

(2) All farms were classified into selected size groups according to the total land area in the farm. The land area of a farm is an operating unit concept and includes land owned and operated as well as land rented from others.

(3) This category includes land from which crops were harvested or hay was cut; land in orchards, citrus groves, vineyards, nurseries, and greenhouses; cropland used only for pasture or grazing; land in cover crops, legumes, and soil-improvement grasses; land on which all crops failed; land in cultivated summer fallow; and idle cropland.

(4) This category includes land from which crops were harvested or hay was cut, and land in orchards, citrus groves, Christmas trees, vineyards, nurseries, and greenhouses.

(5) This category includes all land watered by any artificial or controlled means, such as sprinklers, flooding, furrows or ditches, and spreader dikes. Included are supplemental, partial, and preplant irrigation.

(6) Number of farms with some cropland

Cropping patterns are important to both agricultural and regional economics. Crops in the region include rice, other field crops, truck crops, and tree and vine crops. According to California Agricultural Statistics Service (CASS) California Agricultural Commissioners' data report (CASS 2001), in 2000, the Upstream from the Delta Region contributed $765 million to total field crop value of production, including rice, or about 21 percent of the State total. Practically all of the rice, orchards, vegetables, and cotton acreage within the region are irrigated.

Some field crops utilize relatively large amounts of water per acre for irrigation. If idled, rice fields provide the largest amount of water of any of the region's major crops, approximately 3.3 acre-feet per acre (Water Transfers Office 2002).[4]

The Upstream from the Delta Region produces most of the rice grown in California. In 2000, Colusa County had the largest amount of rice acreage in the region and contributed 25.8 percent of the total value of the State's rice production of $618 million (CASS 2001). After Colusa County, the top four counties for rice production in the region were Sutter (20.6 percent of value), Butte (18.2 percent), Glenn (16.6 percent) and Yuba (6.7 percent) (CASS 2001).

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4 3.3 AF/acre is the estimated ETAW for rice used in the economic analysis (Water Transfers Office 2002). For a definition of ETAW see footnote 11 of this chapter. The estimates of 3.3 acre-feet per acre may be refined in the future as the science for generating these values further develops. Refer to Chapter 2 for more information.

The BEA definition of agricultural net returns is gross crop revenues plus other income less total farming costs. Although higher costs reduce farm profits, some costs represent farm expenditures in the regional economy. In 1999, total cash receipts for the region were approximately $1.5 billion, other income was $0.4 billion, and agricultural net income for the region was estimated to be approximately $232 million (BEA REIS 2000). Table 11-4 shows specific county totals.

Farm production expenses represent income for farm labor, farm supply companies, custom operators, and related businesses. If farm production expenses decrease, then the revenues received by farm labor and businesses also declines. In 1999, total production expenses for the region were about $1.7 billion (Table 11-5). Hired farm labor costs were one of the largest costs reported, accounting for about 32.4 percent of total expenses.

Table 11-4
1999 Agricultural Revenues and Production Costs, Upstream from the Delta Region ($1,000)

	Gross Farm Income[1]							
	Total Cash Receipts			Other Income				
County	Livestock, Production	Crops	Total	Govern-ment Payments	Total Other Income	Total Production Expenses[2]	Realized Net Income[3]	Total Farm Labor and Proprietors Income[4]
Butte	$9,619	$209,466	$219,085	$43,760	$74,101	$286,186	$7,000	$49,911
Colusa	$5,792	$282,188	$287,980	$60,930	$87,327	$308,750	$66,557	$114,982
Glenn	$54,765	$133,319	$188,084	$41,093	$68,456	$251,518	$5,022	$26,283
Placer	$15,744	$24,071	$39,815	$6,824	$12,602	$53,424	-$1,007	$5,771
Sutter	$8,212	$326,740	$334,952	$47,414	$88,374	$330,877	$92,449	$143,413
Yolo	$10,892	$373,020	$383,912	$26,130	$61,196	$374,249	$70,859	$159,021
Yuba	$14,460	$60,127	$74,587	$16,771	$34,809	$117,925	-$8,529	$23,207
Total	$119,484	$1,408,931	$1,528,415	$242,922	$426,865	$1,722,929	$232,351	$522,588

Source: 1999 BEA REIS Data Published 2000

(1) Gross farm income consists of estimates for the following items: cash receipts from marketing of crops and livestock; income from other farm-related activities, including recreational services and the sale of forest products; government payments to farmers; value of food and fuel produced and consumed on farms; gross rental value of farm dwellings; and the value of the net change in the physical volume of farm inventories of crops and livestock.

(2) Production expenses consist of: purchases of feed, livestock, seed, fertilizer and lime, and petroleum products; hired farm labor expenses (including contract labor); and all other production expenses (e.g. depreciation, interest, rent and taxes, and repair and operation of machinery), further broken down in Table 11-5.

(3) Production expenses and gross farm income excluding inventory change are used to calculate realized net income of all farms (gross farm income, excluding inventory change, minus production expenses equals realized net income).

(4) Bureau of Economic Analysis estimate of farm proprietors' income is estimated from modifying realized net income to exclude the income of corporate farms and salaries paid to corporate officers.

Table 11-5
1999 Production Expenses, Upstream from the Delta Region
($1,000)

County	Feed Purchased	Livestock Purchased	Seed Purchased	Fertilizer and Lime	Petroleum Products Purchased	Hired Farm Labor Expenses[1]	Other Production Expenses[2]
Butte	$2,370	$1,165	$8,195	$33,679	$7,767	$102,729	$130,281
Colusa	$1,178	$1,133	$17,283	$38,849	$10,833	$100,003	$139,471
Glenn	$14,897	$6,123	$6,999	$29,495	$7,858	$68,644	$117,502
Placer	$3,785	$1,703	$2,191	$3,878	$1,512	$12,691	$27,664
Sutter	$1,500	$1,001	$11,414	$41,653	$11,436	$107,146	$156,727
Yolo	$1,854	$2,056	$20,373	$46,172	$12,807	$126,149	$164,838
Yuba	$3,699	$862	$2,337	$12,540	$3,406	$41,314	$53,767
Total	$29,283	$14,043	$68,792	$206,266	$55,619	$558,676	$790,250

Source: 1999 BEA REIS Data Published 2000

(1) Hired farm labor includes contract labor.
(2) Other production expenses includes depreciation, interest, rent and taxes, and repair and operation of machinery.

11.1.2.3 County Settings

The regional economic analysis in Section 11.2 describes the economic effects of idling rice fields within selected counties in the Upstream from the Delta Region. The selected counties (Butte, Colusa, Glenn, Placer, Sutter, and Yolo) have extensive rice acreage and water agencies within the counties have shown willingness to participate in the EWA. (See Chapter 2 and Section 11.4.6.1.1.) The following sections describe the existing conditions in these counties. Figure 11-2 shows the general location of the counties within the region.

11.1.2.3.1 Butte County

Butte County is about 60 miles north of Sacramento in California's Central Valley along the Highway 99 corridor and is bordered by the Sacramento River or Butte Creek on the west and the Sierra Nevada Mountains on the east. Historically, Butte County has been an agriculturally based county, and commercial agriculture continues to be the county's principal economic base. Some non-agricultural industry located in Chico provides alternative economic base. Butte County's water supplies include local surface water, the Feather River, and groundwater. The Feather River and groundwater are the largest sources for the county's water demands.

In 1997, Butte County had 1,942 farms on approximately 404,000 acres (USDA 1999). In 1997, farming accounted for 38.5 percent of the county's land area. Butte County's gross value of agricultural production was $291 million in 2000 (CASS 2001).[5] In addition, in 1993, agriculture indirectly contributed an estimated $1 billion annually to the county's economy, as agricultural revenue spent in the county (Butte County 1995). The most valuable crop in Butte County is rice. The county's milled rice, planted on 98,000 acres, generated 18 percent ($112.3 million) of California's gross

[5] The gross value of production includes all farm production, whether sold into usual marketing channels or used on the farm where it is produced. Includes production of field crops, seed crops, vegetable crops, fruit and nut crops, nursery, flowers and foliage, apiary products, livestock, livestock products, poultry and poultry products.

value of agricultural production of rice in 2000 (CASS 2001). Other major crops in the county are almonds, walnuts, and plums. Table 11-6 summarizes the value of production and acreage of Butte County's leading commodities.

Table 11-6
Butte County Leading Commodities, 2000

Commodity	Value of Production ($ Million)	Acreage	Rank Among California Counties
Rice	112.3	98,000	3
Almonds	47.5	36,095	7
Walnuts, English	38.0	18,398	4
Plums, dried	31.1	12,472	2
Peaches, clingstone	7.1	1,933	5
Field crops	7.1	7,106	3
Nursery stock	6.0	N/A	15
Cattle and calves	5.7	N/A	30
Kiwifruit	5.2	1,271	2
Seed, rice	4.5	4,125	3

Source: County Agricultural Commissioners Report 2001

N/A – Not available. Acreage for commodity cannot be enumerated

According to Employment Development Department (EDD) labor statistics, the services sector was the largest employer in the county, employing 24.5 percent of the labor force in 2000. Recent growth within the service industry has been in health services and the social services components (EDD 2001a). Aircraft and parts, colleges and universities, and amusement and recreation services are some of the other major employers in the county (EDD 2001a). According to the Department of Finance (DOF) labor statistics, in 2000, agricultural employment was less than 4 percent (3,000 people) of the civilian labor force (DOF 2002). [6] In 2000, Butte County had an unemployment rate of 7 percent (DOF 2002).

11.1.2.3.2 Colusa County

Colusa County is about 35 miles northwest of Sacramento along the I-5 corridor. The coastal ranges border the county on the west side, and Butte Creek or the Sacramento River is the border on the east. The county has a highly agricultural economy. Relative to other California locations, land in Colusa County is inexpensive and high quality water is generally available. Water sources include groundwater, local surface waters, the Sacramento River, and surface water reuse.

Colusa County had 810 farms in 1997, totaling 430,958 acres, or 38.5 percent of the 736,450 total acres in the county (USDA 1999). The gross value of agricultural production in the county was $346 million in 2000 (CASS 2001). Colusa County ranks as the leading rice-producing county in the United States. Colusa County is also the lead producer of field crops in the region, with a total field crop production value of about $195 million in 2000 (CASS 2001). Major field crops include 147,270 acres of rice, 18,900 acres of wheat, 11,600 acres of safflower, 6,250 acres of hay, and 860 acres of

[6] Agricultural employment includes agricultural workers who are employed by farm labor contractors; employment data do not include unpaid family workers.

field corn. A University of California Cooperative Extension (UCCE) profile states that in Colusa County, "there is currently a transition from row crops to perennial crops (almonds, grapes, walnuts) and from low-value agronomic crops to higher value vegetables or other row crops" (UCCE 2002).

Table 11-7 displays the county's major crops and associated value of production, acreage, and rank among California counties.

Table 11-7
Colusa County Leading Commodities, 2000

Commodity	*Value of Production ($ million)*	*Acreage*	*Rank Among California Counties*
Rice	159.9	147,270	1
Tomatoes, processing	41.8	20,900	4
Seed, vegetables & vinecrop	28.4	11,410	1
Almonds (meats)	28.2	21,800	8
Cattle and calves	10.7	N/A	21
Cotton lint, upland	10.5	10,820	5
Seed, rice	8.0	7,730	2
Walnuts, English	6.9	4,250	11
Plums, dried	6.2	4,100	7

Source: County Agricultural Commissioners Report 2001

N/A – Not available. Acreage for commodity cannot be enumerated

Colusa is primarily a rural agricultural county, with a total population of about 19,000 in 1999 (BEA REIS 2000). In 2000, agricultural employment in Colusa County was 28.8 percent (or 2,540 employees) of total employment, the highest share in the Sacramento Valley (DOF 2002). A little over 19 percent of the workforce was employed in the government sector and 15 percent in retail trade (DOF 2002). Some of the other major employers in the county include trucking and courier services, amusement and recreation services, oil and gas field services, and groceries and related products (EDD 2001a). In 2000, Colusa County had an unemployment rate of 17.6 percent (DOF 2002).

11.1.2.3.3 Glenn County

Glenn County is about 100 miles northwest of Sacramento, along the I-5 corridor. The county includes the western boundary of the Mendocino National Forest and has the Sacramento River as its eastern boundary. Glenn County has a highly agricultural economy. The county has a high quality water supply; groundwater, local surface water and Sacramento River water are the main sources of supply.

Glenn County had 1,189 farms in 1997. In 1999, farmland occupied 57.3 percent, or 482,583 acres of the county's total land area (USDA 1999). In 2000, Glenn County's major commodities were rice, almonds, milk products, prunes and livestock. Table 11-8 presents value of production and acreage of the county's top commodities. The county's gross value of farm production was $280.9 million in 2000. In 2000, field crops produced over $140 million in total value annually. Rice was produced on 87,383 acres and the total production value was over $100 million (CASS 2001).

Table 11-8 Glenn County Leading Commodities, 2000			
Commodity	**Value of Production ($ million)**	**Acreage**	**Rank Among California Counties**
Rice, paddy	102.5	87,383	4
Dairy products	32.9	N/A	15
Almonds	27.8	25,433	9
Plums, dried	18.1	9,121	5
Cattle and calves	16.4	N/A	13
Corn	10.0	16,285	5
Walnuts	8.6	7,828	9
Hay, alfalfa	8.3	15,067	17
Olives	5.3	4,645	3
Sugar beets	4.7	3,601	7

Source: County Agricultural Commissioners Report 2001
N/A – Not available. Acreage for commodity cannot be enumerated

Government was the top industry in Glenn County in 2000, employing 22 percent of the county's labor force (DOF 2002). Agriculture employed 14.4 percent (1,520 people) of the work force in Glenn County. Manufacturing jobs, a substantial portion of which are in food processing, constitute 8 percent of local employment in 2000 (DOF 2002). In 2000, Glenn County had an unemployment rate of 12 percent (DOF 2002).

11.1.2.3.4 Placer County

Placer County is about 15 miles northeast of Sacramento along the I-80 corridor. The county encompasses the rim of the Sacramento Valley to the west and the Sierra Nevada Mountains, Lake Tahoe, and the Nevada border to the east. Placer County has urban and agricultural areas and is one of the fastest growing counties in California (EDD 2001). The county's water supply includes surface water and groundwater. A large share of the water supply comes from surface water runoff stored by Nevada ID, PG&E and others (Hutchison 2002).

In 1997, of the 898,820 acres of land within the county, 139,597 acres were occupied by 997 farms. Farmland accounted for 15.5 percent of the total land area. From 1992 to 1999, the number of farms in the county decreased 12 percent (USDA 1999).

Currently, Placer County's major commodities include milled rice, cattle and calves, and nursery products. Table 11-9 presents the top commodities in the county in terms of gross value of production. The county's total gross value of agricultural production in 2000 was $60.5 million (CASS 2001).

Table 11-9 Placer County Leading Commodities, 2000			
Commodity	**Value of Production ($ million)**	**Acreage**	**Rank Among California Counties**
Rice, milling	15.8	15,799	7
Cattle and calves	13.7	N/A	17
Nursery products	11.5	N/A	30
Pasture, irrigated	2.8	25,000	12
Walnuts, english	1.6	1,091	18
Livestock products	1.6	N/A	11
Pasture and range	1.5	171,000	34
Sheep and lambs	0.9	N/A	9
Plums	0.8	439	6

Source: County Agricultural Commissioners Report 2001

N/A – Not available. Acreage for commodity cannot be enumerated

In 2000, agricultural employment was less than 3.5 percent (4,000 people) of the civilian workforce in Placer County. In fact, over 50 percent of the workforce was employed in trade and service industries (DOF 2002). Recently an influx of major corporations, including numerous technology firms, has occurred in Placer County. In 2000, the county's unemployment rate was 3.2 percent, lower than that of the State unemployment rate of 4.9 percent (DOF 2002).

11.1.2.3.5 Sutter County

Sutter County is about 40 miles north of Sacramento, along the State Highway 99 corridor, in the Sacramento Valley between the Sacramento and Feather Rivers. The county has a highly agricultural economy. Sutter County's water supply includes surface water from the Feather and Sacramento Rivers, other surface water, surface water reuse, and groundwater wells (Dahlman 2002).

In 1997, there were 1,317 farms occupying 248,349 acres (90.3 percent) of the 385,600 total acres in the county (USDA 1999). The gross value of Sutter County's agriculture production in 2000 was $343.5 million (CASS 2001), 21st in the state. The main commodities in 2000 were rice, dried plums, peaches, and walnuts (see Table 11-10 for other top commodities). In 2000, Sutter County accounted for 20.6 percent of total rice production value (CASS 2001). The county produced approximately $154 million of rice, corn, safflower, hay/alfalfa, wheat and various other field crops. In 2000, rice was planted on a total of 107,704 acres, and corn, safflower, hay, pasture and wheat were on 6,992 acres, 12,914 acres, 6,571 acres, 11,556 acres and 9,003 acres, respectively.

Table 11-10
Sutter County Leading Commodities, 2000

Commodity	Value of Production ($ million)	Acreage	Rank Among California Counties
Rice	144.6	107,704	2
Plums, dried	43.5	4100	1
Peaches	38.5	10,446	3
Walnuts	26.5	15,886	5
Tomatoes	17.5	9700	13
Melons	10.1	4376	8
Nursery products	8.2	N/A	31
Almonds	6.3	5549	12
Cattle and calves	5.3	N/A	32
Hay, alfalfa	4.3	6571	21

Source: County Agricultural Commissioners Report 2001
N/A – Not available. Acreage for commodity cannot be enumerated

Approximately 32,100 people were in Sutter County's workforce and the unemployment rate was 13 percent in 2000 (DOF 2002). According to the 1996 General Plan, agriculture and agriculturally related services and industries have dominated employment in the county (Sutter County 1996). In 2000, about 17 percent (6,200 people) of Sutter County's civilian workforce was employed in agriculture. Other major industries in the county were the retail trade and service industries; each employed about 5,400 people in 2000 (DOF 2002).

11.1.2.3.6 Yolo County

Yolo County is immediately west of Sacramento County near the southern end of the Sacramento Valley along the I-80 and I-5 corridors. Bordered by the Vaca Mountains to the west and the Sacramento River to the east, Yolo County encompasses 1,034 square miles (Yolo County 1983). The county has a very agricultural economy except that some urban areas are tied to education facilities and the Sacramento urban economy. Yolo County's water supply includes groundwater and surface water. Important surface waters are the Cache Creek System, which includes Clear Lake, Indian Valley Reservoir, and Cache Creek upstream from the Capay Diversion Dam, and water from the Sacramento River via diversions and drainage channels.

In 1997, Yolo County had 923 farms on approximately 536,595 acres (USDA 1999). Farming accounted for approximately 82.8 percent of the county's land area (USDA 1999). The most valuable crop in Yolo County was tomatoes for processing. In 2000, the county's tomato crops, planted on 48,575 acres, generated about 13 percent ($76.5 million) of California's processing-tomato income (CASS 2001). Within the State, only Fresno County generates more income from tomatoes on more acres. Other major crops in the county are grapes, rice, and hay. Table 11-11 provides data on Yolo County's leading commodities.

Table 11-11 Yolo County Leading Commodities, 2000			
Commodity	**Value of Production ($ million)**	**Acreage**	**Rank Among California Counties**
Tomatoes, Processing	76.5	48,575	2
Grapes, Wine	40.9	9,496	11
Rice	34.6	36,229	6
Hay, Alfalfa	21.4	38,720	14
Seed Crops	20.0	N/A	
Corn, Field (grain)	13.7	28,125	2
Cattle and Calves	10.0	N/A	22
Walnuts	9.9	8,497	8
Wheat	8.4	43,144	6
Melons, Honeydew	7.5	4,342	3

Source: County Agricultural Commissioners Report 2001

N/A – Not available. Acreage for commodity cannot be enumerated.

In 2000, the agricultural industry employed about 5,000 people, less than 6 percent of the civilian workforce. Other major industries in the county were state-local government and trade industries, which employed 26,600 and 21,800 people, respectively (DOF 2002). In 2000, Yolo County had an unemployment rate of 4.3 percent (DOF 2002).

11.1.3 Export Service Area

This section describes regional and agricultural economic conditions in Fresno, Kern, Kings, and Tulare Counties of the Export Service Area. This description of the affected environment does not include the Southern California portion of the Export Service Area, in which regional agricultural economic effects from the EWA are unlikely. In Chapter 11, the term "Export Service Area" always means Fresno, Kern, Kings, and Tulare Counties.

Section 11.1.3.2 describes the settings in Fresno, Kern, Kings and Tulare Counties, which are the counties most likely to experience agricultural economic effects as a result of EWA water purchases. These counties are shown in Figure 11-3.

Figure 11-3
Counties in the Export Service Area

11.1.3.1 Regional Setting – Export Service Area

Table 11-12 shows economic variables estimated by industry in the Export Service Area. The regional population in 1999 was approximately 1.8 million (BEA REIS 1999). In 1999, the region employed approximately 823,000 people. Primary employers were services, agriculture/forestry/fisheries, retail trade, services, and government. Employment in agriculture has decreased in recent years. In 1999, the agricultural sector provided about 98,000 jobs (or 11.9 percent of employment) in the region (BEA REIS 2000).

Table 11-12
1999 Total Industry Earnings and Employment in the Export Service Area [1]

	Total Industry Earnings ($1,000)	***Total Industry Employment (jobs)***
Total	**$24,492,217**	**823,222**
Agriculture, Forestry, Fishing	$1,542,613	98,189
Mining	$587,166	9,902
Construction	$1,650,448	45,410
Manufacturing	$2,092,673	57,735
Transportation, Comm., Utilities	$1,685,642	36,965
Wholesale Trade	$1,224,966	32,209
Retail Trade	$2,631,617	138,922
Finance, Insurance, Real Estate	$1,071,016	43,606
Services	$5,495,303	215,425
Govt. Enterprise & Special Industry	$6,510,773	144,859

Source: 1999 BEA REIS Data Published 2000

(1) Data for Fresno, Kern, Kings, and Tulare Counties, except where noted below. REIS data did not include some county estimates for industry earnings and employment by sector to avoid disclosure of confidential information. Kings and Tulare estimates are not included in mining and financial sectors

Total industry earnings for the region were about $24 billion in 1999. Largest contributors to total earnings were government (26.6 percent), services (22.4 percent) and retail trade (10.7 percent). Agriculture, forestry, and fishing provided 6.3 percent, approximately $1.5 billion, of the region's total earnings (BEA REIS 1999). In 1999, the agriculture, forestry and fishing sector in Tulare, Kern, and Fresno Counties provided 7.4 percent, 5.8 percent and 5.3 percent of county industry earnings, respectively. Average per capita income for the region was $19,023 (BEA REIS 2000). Table 11-13 summarizes economic activity by county in the Export Service Area.

Table 11-13
1999 Economic Activity in the Export Service Area, $1,000

County	Personal Income				Total Industry Earnings[1]	Total Employment[2] (jobs)	Total Population (persons)
	Total	Nonfarm	Farm	Per Capita (dollars)			
Fresno	$16,135,625	$15,496,060	$639,565	$21,146	$11,307,494	406,823	763,069
Kern	$12,776,502	$12,392,868	$383,634	$19,886	$9,226,525	309,598	642,495
Kings	$1,938,811	$1,839,351	$99,460	$15,732	$1,413,555	48,952	123,241
Tulare	$6,928,875	$6,229,845	$699,030	$19,329	$4,558,793	173,455	358,470
Total	$37,779,813	$35,958,124	$1,821,689		$26,506,367	938,828	1,887,275

Source:1999 BEA REIS Data Published 2000

Refer to Table 11-2 definitions of terms

11.1.3.2 Agricultural Economics

Table 11-14 provides data on number of farms and their acreage in the Export Service Area.

Table 11-14
Farm and Cropland Profiles of Counties in the Export Service Area, 1997

County	Number of Farms	Land in Farms (acres)	Average Farm Size (acres)	Total Cropland		Harvested Cropland		Irrigated Land	
				Farms	Acres	Farms	Acres	Farms	Acres
Fresno	6,592	1,881,418	285	6,005	1,250,984	5,730	1,157,357	5,810	1,153,812
Kern	1,997	2,851,462	1,428	1,522	1,054,228	1,360	893,221	1,406	912,584
Kings	1,079	656,968	609	935	526,132	830	445,537	892	421,365
Tulare	5,446	1,309,525	240	4,992	703,295	4,812	639,578	4,809	625,070
Total	**15,114**	**6,699,373**	**641**	**13,454**	**3,534,639**	**12,732**	**3,135,693**	**12,917**	**3,112,831**

Source: 1997 USDA Data, Published 1999

Refer to Table 11-3 for definitions of terms

In 1997, the average farm size in counties in the Export Service Area was 641 acres. In 1997, the region supported about 3.5 million acres of total cropland, of which 3.1 million acres were irrigated land (USDA 1999). Ownership patterns describe the number of farm owners who live within a region. In 1997, full owners operated about 73 percent of farms or approximately 11,014 farms, and part owners or tenants operate the remaining farms in the counties in the Export Service Area (USDA 1999).

As measured by harvested acres, cotton was the number one crop in the Export Service Area. In 2000, Fresno contributed 34.0 percent of the total $905 million production value of cotton lint in the State, while Kings and Kern supplied 21.8 percent and 21.4 percent, respectively (CASS 2001). Other important crops in the region, as measured by value of production, were other field crops, orchards, grapes, and alfalfa.

In 2000, the Export Service Area accounted for 39 percent of the State's livestock production value, about 41 percent of fruit and tree-nuts value, and about 43 percent of field crop value (CASS 2001). In 1999, total agricultural cash receipts for the region were about $7.6 billion. Including other income and government payments, agricultural income for the region was estimated at $8.2 billion. Production expenses were about $7.6 billion in 1999, leaving a net cash return of $0.6 million (BEA REIS 2000). Hired and contract labor was the largest expense reported, accounting for

about 31 percent of total expenses (BEA REIS 2000). Tables 11-15 and 11-16 summarize farm income and production expenditures by county in the Export Service Area.

Table 11-15
1999 Agricultural Revenues and Production Costs, Export Service Area
($1,000)

County	Total Cash Receipts			Other Income		Total Production Expenses	Realized Net Income	Total Farm Labor and Proprietors Income
	Total	Livestock, Production	Crops	Govt. Payments	Total Other Income			
Fresno	2,862,748	805,061	2,057,687	76,417	201,198	2,877,951	185,995	639,565
Kern	1,989,160	237,018	1,752,142	59,913	127,357	2,136,293	-19,776	383,634
Kings	662,178	372,252	289,926	31,065	64,219	733,770	-7,373	99,460
Tulare	2,077,356	1,084,493	992,863	65,244	197,177	1,862,213	412,320	699,030
Total	7,591,442	2,498,824	5,092,618	232,639	589,951	7,610,227	571,166	1,821,689

Source: 1999 BEA REIS Data Published 2000
Refer to Table 11-4 for further definitions of terms

Table 11-16
1999 Production Expenses, Export Service Area
($1,000)

County	Feed Purchased	Livestock Purchased	Seed Purchased	Fertilizer and Lime	Petroleum Products Purchased	Hired Farm Labor Expenses	Other Production Expenses
Fresno	306,110	213,139	52,832	279,052	65,569	867,885	1,093,364
Kern	60,426	29,343	52,924	212,317	43,977	755,157	982,149
Kings	144,680	17,292	17,874	78,182	21,500	173,733	280,509
Tulare	303,231	65,907	18,774	130,927	32,890	531,376	779,108
Total	814,447	325,681	142,404	700,478	163,936	2,328,151	3,135,130

Source: 1999 BEA REIS Data Published 2000
Refer to Table 11-5 for further definitions of terms

11.1.3.3 County Settings

The regional economic analysis in Section 11.2 evaluates the economic effects of idling cotton fields within selected counties in the Export Service Area. The counties (Fresno, Kern, Kings, and Tulare) have extensive cotton acreage, and water agencies within the counties have shown willingness to participate in the EWA. (Refer to Chapter 2.) The following section describes the existing conditions in these counties.

11.1.3.3.1 Fresno County

Fresno County is in the central San Joaquin Valley. The Sierra Nevada rises out of the low foothills on the county's eastern boundary, and the county's western border extends into the Diablo Mountains (EDD 2001a). The valley floor between is 50 to 60 miles wide and contains some of the most productive agricultural land in the country. The county's economy is highly agricultural except that some urban areas such as Fresno have a more diverse economic base. Fresno County agriculture relies on local surface water, groundwater, and CVP contracts for most of its surface water supply. The groundwater basin below the county is an important water supply.

In 1997, Fresno County had 6,592 farms encompassing 1,881,418 acres (49.3 percent of total county acres). The average size of farms increased 13 percent from 253 acres in

1992 to 285 acres in 1997 (USDA 1999). Irrigated acreage in 1997 was 1,538,812 acres (USDA 1999).

With extensive acreage and intensive agriculture, Fresno County had the largest dollar value of agricultural production in the State, $3.41 billion, in 2000 (EDD 2001a). In 2000, fruit and nut crops contributed $1.24 billion to total value, and field crops contributed $507 million (CASS 2001). Cotton was valued at $354 million, a 6.61 percent increase from 1999 (Fresno County Agricultural Commissioner's Office 2001). Grapes have been the leading crop for over twenty years. In 2000, the value of grapes reached $642 million, about 18.7 percent of the county's total production value (CASS 2001). Table 11-17 shows the leading commodities by value and acreage.

Table 11-17
Fresno County Leading Commodities, 2000

Commodity	Value of Production ($ million)	Acreage	Rank Among California Counties
Grapes	642.3	225,276	1
Poultry	400.0	N/A	1
Cotton	354.4	302,700	1
Tomatoes	279.7	121,520	1
Milk	198.8	N/A	7
Cattle and Calves	186.7	N/A	2
Almonds	117.9	57,350	3
Head Lettuce	109.0	20,020	2
Plums	96.7	14,841	1
Peaches	95.1	13,953	1

Source: County Agricultural Commissioners Report 2001

N/A – Not available. Acreage for commodity cannot be enumerated

In 2000, Fresno County had an unemployment rate of 14.3 percent (DOF 2002). High unemployment is a result of seasonal variations in the demand for farm labor (EDD 2001a). The agricultural industry employed 77,500, or 20 percent of the civilian labor force, in 2000 (DOF 2002). Other major employers in the county include colleges and universities, hospitals, poultry and eggs, and department stores (EDD 2001a).

11.1.3.3.2 Kern County

Kern County is on the south end of the San Joaquin Valley and is bordered by the Temblor Mountain Range along the county's western boundary, the Tehachapi Mountains on the south and the Sierra Nevada Mountains to the east. About one-third of the county is within the valley floor of the San Joaquin Valley. Kern County is the third largest county in California in land area (EDD 2001a). The counties' economy is agricultural except that transportation, petroleum and some urban areas provide other economic base. Water sources include local and imported surface water and groundwater.

Kern County contributed approximately $2.2 billion to the gross value of agricultural production, ranking it number four in the State in 2000 (CASS 2001). Kern County relies heavily on groundwater for agricultural uses; however, some water agencies

have SWP and CVP water supplies. Irrigated acreage in 1998 was 861,900 acres (Kern County Water Agency 2002).

In 1997, Kern County had 1,997 farms encompassing over 2.8 million acres (USDA 1999). Farmland made up 54.7 percent of the 5.2 million acres in the county. The average farm size was 1,428 acres (USDA 1999).

Kern County ranks in the top five agricultural counties in the United States (EDD 2001a). In 1990, cotton was the county's most valuable crop with a production value of about $352 million (Kern County Agriculture Commissioner's Office 1991). In 1993, grapes replaced cotton as the most valuable crop. Citrus became the second highest value crop in 1997 because of increased prices and more acreage in production (Kern County Agriculture Commissioner's Office 1998). Over time, Kern County has shown a decrease in cotton acreage and an increase in permanent crop acreage.

In 2000, Kern County's top five commodities, grapes, citrus, cotton, milk and almonds, accounted for 57 percent of Kern County's total value of production. Table 11-18 shows the leading commodities by value and acreage.

Table 11-18
Kern County Leading Commodities, 2000

Commodity	*Value of Production ($ million)*	*Acreage*	*Rank Among California Counties*
Grapes	438.3	85,971	2
Citrus, Fresh and Processing	291.1	41,405	2
Cotton, including Seed	226.0	196,075	3
Milk, Marketing and Manufacturing	156.3	N/A	5
Almonds	142.2	82,572	1
Pistachios	124.0	29,077	1
Nursery Crops	106.2	3,440	10
Hay, Alfalfa	91.2	129,000	2
Potatoes, Fresh and Processing	78.7	20,390	1
Cattle and Calves	55.9	N/A	6

Source: County Agricultural Commissioners Report 2001

N/A – Not available. Acreage for commodity cannot be enumerated

In 2000, Kern County's work force was about 287,000 people. Agriculture was the third largest employer for Kern County in 2000, following government (18.0 percent) and services (17.1 percent) (EDD 2001). Agriculture provided 16.3 percent of total employment with approximately 46,900 jobs (DOF 2002). The agricultural industry increased by 2000 jobs in the year 2000 (EDD 2001). Other major employers in the county include hospitals, schools, groceries and related products, and public administration (EDD 2001). In 2000, the county had a relatively high unemployment rate of 11.3 percent (DOF 2002).

11.1.3.3.3 Kings County

Kings County is in the southern half of the San Joaquin Valley, north of Kern County. The county is the smallest of the Export Service Area counties considered in the analysis. Its borders are the Kings River and the Kettle Hills to the southwest (EDD

2001a). The county is composed mainly of level farmland, crossed by the California Aqueduct and a number of other irrigation waterways. The economy is very agricultural. Kings County relies heavily on groundwater and local surface water supply.

In 1997, 421,365 irrigated acres represented approximately 70 percent of total land in farms (USDA 1999). In 1997, of the total 897,280 county acres, 617,030 acres, about 68.7 percent, was devoted to farmland. In 1997, there were 1,079 farms (USDA 1999). With double cropping, field crops accounted for 641,117 total harvested acres and fruit and nut crops were planted on 30,634 acres.

In 2000, Kings County was ranked 12th in the state in total agricultural production with a gross value of $885 million, a 1.8 percent decrease from the all time high level set in 1999 (Kings County Agricultural Commissioner's Office 2000). The value of field crops increased by about $22 million from 1999 to 2000 and vegetable crop value increased $10 million (Kings County Agricultural Commissioner's Office 2001). The top five commodities in 2000 in the county were milk, cotton, cattle and calves, alfalfa and hay, and turkeys. Total milk value was approximately $292 million and total cotton value was $232 million (CASS 2001). Kings County produces upland and pima cotton varieties, 113,106 acres and 86,494 acres, respectively. Table 11-19 shows the leading commodities by value and acreage.

Table 11-19
Kings County Leading Commodities, 2000

Commodity	*Value of Production ($ million)*	*Acreage*	*Rank Among California Counties*
Milk, Market	291.8	N/A	5
Cotton Lint, Upland	111.7	113,106	3
Cotton Lint, Pima	85.9	86,494	1
Cattle and Calves	62.6	N/A	3
Cottonseed	34.4	9,265	4
Hay, Alfalfa	33.9	53,710	8
Turkeys	30.4	N/A	3
Wheat, All	28.9	95,330	1
Tomatoes, Processing	19.0	9,969	7
Vegetable Crops	17.6	3,372	18

Source: County Agricultural Commissioners Report 2001
N/A – Not available. Acreage for commodity cannot be enumerated

In 2000, Kings County had an unemployment rate of 13.9 percent (DOF 2002). In 2000, agriculture was the second largest employer in the county, employing 7,710 or 16.8 percent of the civilian labor force (DOF 2002). Government was by far the largest industry, employing 27 percent of the labor force. The service industry was the third largest employer (DOF 2002). Other major employers in the county include public administration, hospitals, and preserved fruits and vegetables (EDD 2001a).

11.1.3.3.4 Tulare County

Tulare County is north of Kern County. The Sierra Nevada range dominates the eastern portion of the county, while extensively cultivated lands on the valley floor are the major features of the western half. Almost half the county's 3.1 million acres is devoted to national parks and forests, including Sequoia and Kings Canyon National Parks and Inyo and Sequoia National Forests (EDD 2001). The economy is very agricultural except that some transportation and urban economic base is located along the Highway 99 corridor. Tulare County relies on groundwater, local surface water, and SWP and CVP imported water for irrigation.

In 1997, Tulare County had 5,446 farms encompassing over 1.3 million acres (USDA 1999). Farming represented about 42.4 percent of total county land area. Acres in cotton have decreased approximately 35 percent since 1987, while land in orchards has increased 14 percent (USDA 1999).

In 2000, Tulare County was the second highest-ranking county in California in gross value of agricultural production, at over $3 billion (CASS 2001). Fruit and nut crops accounted for $1.3 billion of the total value. Livestock and poultry products had a production value of $8.7 million in 2000. The top five commodities in 2000, milk, oranges, grapes, cattle and calves, and plums, accounted for 71.5 percent of Tulare County's total production. Cotton had a production value of $84 million (CASS 2001). Table 11-20 shows the leading commodities by value and acreage.

Table 11-20
Tulare County Leading Commodities, 2000

Commodity	*Value of Production ($ million)*	*Acreage*	*Rank Among California Counties*
Milk	857.2	N/A	1
Oranges, Navel and Valencia	451.2	104,751	1
Grapes	419.0	78,264	3
Cattle and Calves	375.2	N/A	1
Plums	91.5	18,054	2
Cotton Lint and Seed	84.0	79,410	4
Hay and Silage, Alfalfa	78.6	92,888	3
Peaches	67.4	13,931	2
Nectarines	62.2	14,995	2
Corn, Grain and Silage	51.8	110,474	1

Source: County Agricultural Commissioners Report 2001

N/A – Not available. Acreage for commodity cannot be enumerated

In 2000, agriculture employed approximately 35,500 persons, almost 21 percent of total employment (DOF 2002). Dairy products, schools, and hospitals are other major employers in the county. In addition to substantial packing/shipping operations, light and medium manufacturing plants are increasing in number and becoming an important factor in the county's total economy (EDD 2001a). In 2000, the unemployment rate was 15.4 percent (DOF 2002).

11.1.4 Property Tax Revenue

The affected environment for property tax revenues includes those counties that might participate in EWA water acquisition by idling irrigated land for water transfers.

The California Legislature passed the Williamson Act in 1965 to preserve open space and agricultural lands by discouraging premature and unnecessary conversion to urban use. The Williamson Act authorizes local governments and property owners to voluntarily enter into contracts to commit land to specified uses for 10 years or more. Once the land is enrolled, it is valued at a reduced rate for property tax purposes pursuant to valuation laws. Chapter 13, Table 13-1 shows acreage enrolled in the Williamson Act.

The Open Space Subvention Act provides partial replacement of local property tax revenues foregone as a result of participation in the Williamson Act. The Open Space Subvention Act allows the State to pay counties $5 per acre for prime agricultural land and $1 per acre for all other agricultural land that participates in the Williamson Act.[7] One condition for prime land classification under the Williamson Act is that the land has produced a gross crop value of not less than two hundred dollars ($200) per acre for 3 of the previous 5 years. If farmers idle a parcel of Prime land for any 3 out of 5 years, the State could reclassify that parcel to a lower level and the county could lose $4 per acre of Open Space Subvention Act revenues.

Table 11-21 summarizes total property tax revenues and Open Space tax relief payments the county governments received during Fiscal Year 1999 to 2000.

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[7] Prime agricultural land under the Williamson Act means any of the following:

- All land that qualifies for rating as class I or class II in the Natural Resource Conservation Service land use capability classifications.
- Land which qualifies for rating 80 through 100 in the Storie Index Rating.
- Land which supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the United States Department of Agriculture.
- Land planted with fruit- or nut-bearing trees, vines, bushes, or crops which have a nonbearing period of less than 5 years and which will normally return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than $200 per acre.
- Land which has returned from the production of unprocessed agricultural plant products an annual gross value of not less than two hundred dollars ($200) per acre for 3 of the previous 5 years.

Table 11-21 County Property Tax Revenues and Open Space Tax Relief Aid, Fiscal Year 1999-2000, Dollars		
County	**Total Property Tax**	**Open Space Tax Relief Payment**
Butte	$13,431,708	$642,887
Colusa	$4,888,116	$584,299
Glenn	$3,293,736	$710,593
Placer	$45,963,637	$100,249
Sutter	$8,040,433	----
Yolo	$11,665,837	$1,148,612
Fresno	$70,008,544	$5,813,928
Kern	$110,870,978	$5,194,660
Kings	$11,135,985	$2,833,900
Tulare	$30,221,403	$3,519,857

Source: State Controller's Office 2000

11.1.5 Groundwater Pumping Costs

The affected environment for groundwater pumping costs includes all counties overlying groundwater basins with potential EWA actions. Within this region, groundwater costs could be potentially affected anywhere that groundwater users participate in groundwater substitution transfers.

Agricultural groundwater costs vary considerably throughout California. Many factors influence these costs, including depth to groundwater, pump efficiencies, and power costs. The California Water Plan Update presents a range of averages for agricultural groundwater costs for the hydrologic regions, which are summarized in Table 11-22. Groundwater pumping costs tend to increase during drought as more water is pumped and average depth to water increases.

Table 11-22 Typical Agricultural Groundwater Production Costs in 1992 by Hydrologic Region	
Region	**Groundwater Costs ($/acre-foot)**
Sacramento River	30-60
San Joaquin	30-40
Tulare Lake	40-80

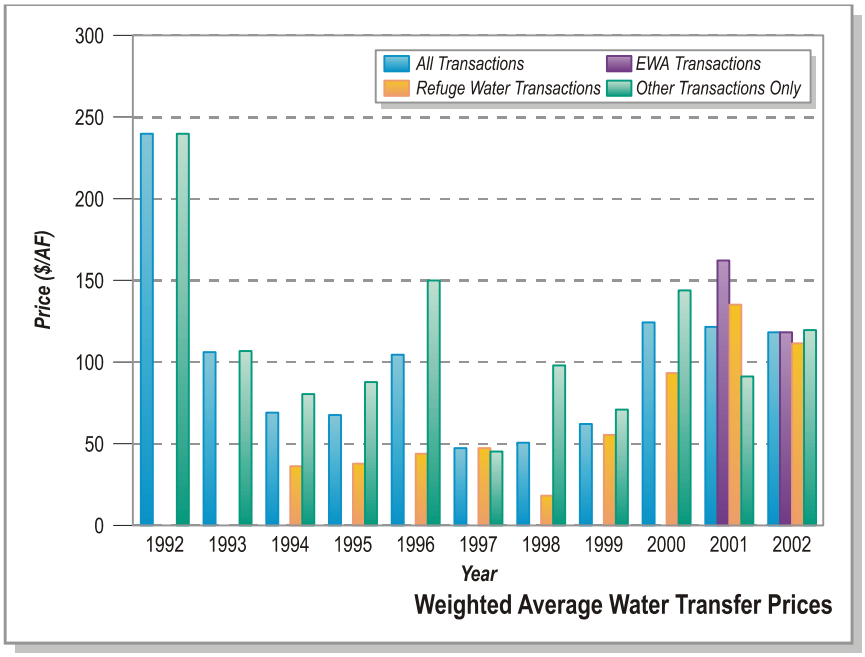
Source: DWR 1993
The range represents the average cost a specific locations within a region, and includes capital, operations, and maintenance and replacement costs.

11.1.6 Water Transfer Market Effects

The affected environment for water transfer market effects includes all EWA regions across California. This area includes the State and Federal Project service areas and areas that could be affected by exchange of water.

A CALFED program objective is to develop a water market that effectively transfers water from willing sellers to buyers, while protecting third-party water users and the environment (CALFED 2001). The water transfers market has grown markedly in the past years. The Public Policy Institute of California (PPIC) estimated that the total volume of water transfers in California has recently ranged from 0.5 acre-foot to 1.2

million acre-feet annually. (PPIC 2002, see Table 11-40.) Figure 11-4 shows prices of major water transfers from 1992 to 2002. The prices have varied over time, and statistical analysis suggests that a trend in the prices over time does not exist.



Sources: Stratecon, Inc. 1992-2003, Water Transfers Office 2003 and 2003a, USBR 2003

Figure 11-4
Weighted Average Prices of Major Water Transfers 1992-2002

The wide variation in prices may be caused by differences in location of the transfers, types of buyers and sellers, timing of availability, water quality, and variation in demand and supply conditions. Also, prices for water transfers may reflect individual negotiations between buyers and sellers rather than competitive market prices.

Factors affecting demand include hydrologic conditions, institutional factors, and agricultural prices. If hydrologic conditions are dry, the price of water transfers typically increases. This premise is supported by Figure 11-4. Prices appear to be higher during 1992, 2001, and 2002, all years which were classified as "dry" under the Sacramento Valley Index (CDEC 2002). When conditions were wet, as in 1995 through 1999, there is more supply and less demand for water transfers, and prices are generally lower. Institutional factors include changes in water allocation caused by changes in laws, regulations and court decisions. For example, recent decisions regarding Colorado River supplies have affected the demand for water transfers to Southern California.

Higher agricultural prices should both increase demand for water transfers and reduce their supply. If agricultural prices are low, more farmers should be willing to participate in water transfers and sell their irrigation water, thereby decreasing the price. According to California Department of Food and Agriculture (CDFA) Resource Directory (2002), upland cotton prices in 1996 were estimated at $0.82 per pound. In 1998, value of rice was estimated at $0.0919 per pound (CDFA 2002). In 2001, the minimum price received by farmers participating in Federal programs was $0.5192 per pound for cotton and $0.065 per pound for rice, both much lower than mid-1990s

levels. These lower crop prices probably increased the willingness of cotton and rice farmers to participate in water transfers in the early 2000s.

11.2 Environmental Consequences/Environmental Impacts

This section describes the effects of EWA actions related to economics. First, section 11.2.1 discusses regulatory requirements for reporting and analyzing economic effects. Then, section 11.2.2 describes assessment methods. Section 11.2.3 describes how economic considerations are being incorporated into the EWA program. Finally, economic effects of the No Action/ No Project, Flexible Purchase Alternative, and Fixed Purchase Alternative are discussed. The analyses first discuss crop idling effects, followed by property tax effects, groundwater cost effects and water transfer market effects. The section ends with a discussion of potential cumulative effects.

11.2.1 NEPA/CEQA Issues

Social and economic changes resulting from a project are addressed somewhat differently under CEQA than under NEPA. CEQA does not consider economic or social changes resulting from a project as adverse effects on the environment. If a physical change in the environment is caused by economic or social effects, the physical change may be regarded as an adverse effect. Because the economic effects of EWA actions do not change the physical environment, a CEQA analysis is not necessary or included in this chapter.

Additionally, under CEQA, the economic or social effect of a project may be used to determine the significance of physical changes caused by the project. For example, economic effects of crop idling could be used to help judge the significance of land use changes. However, the land use effects analysis considers EWA crop idling actions to be less than significant because they do not result in permanent changes to the land use. (Refer to Chapter 13 for further discussion.) Therefore, economic effects are not needed to judge the significance of land use changes.

Under NEPA, economic or social effects must be discussed if they are inter-related to the natural or physical environmental effects of a project. Since economic effects of the EWA are related to physical environmental effects, a NEPA analysis is required. However, NEPA does not require that economic impacts be judged for significance. Therefore, this chapter provides a description of economic effects but does not attempt to determine significance of any economic effects.

In any alternative, the EWA agencies would be responsive to local environmental, economic, and social concerns. The EWA program will include a number of actions to avoid and reduce adverse economic effects. Section 11.2.3 describes these actions.

11.2.2 Assessment Methods

Under each alternative, the EWA Project Agencies would negotiate contracts with willing sellers based on a number of factors including price, water availability, and

location. The EWA Project Agencies may choose to vary their acquisition strategy each year as these factors and others change. Crop idling would occur primarily in dry years in the Upstream from the Delta Region, and primarily in the Export Service Area in wetter years. Other programs would seek crop idling transfers upstream in dry years as well. (Refer to Section 11.2.8.)

To provide a maximum effects analysis, this chapter includes a high level of potential transfers even though the EWA Project Agencies would not likely transfer this much water in a given year. Chapter 2 defines the transfers that are included in the analysis. EWA acquisitions through crop idling and groundwater substitution, purchase, or storage could result in economic effects in the Upstream from the Delta Region and the Export Service Area. In general, any EWA water acquisition could affect market prices for water transfers. The subsections below describe how potential economic effects of crop idling, groundwater acquisitions, and potential changes in water transfer market prices were evaluated.

11.2.2.1 Crop Idling

In crop idling acquisitions, participating farmland owners would voluntarily cease irrigation of rice or cotton for a crop season and transfer the unused irrigation water to the EWA. The EWA Project Agencies would only idle irrigated land by mutual agreement with willing sellers. Economic effects would occur only to the extent that water is obtained by crop idling. (See Section 11.2.7 Comparative Analysis for discussion of crop idling actions during wet and dry years.)

Several institutional issues must be overcome to idle cropland for water transfers. (Refer to Chapter 2 for further discussion.) This document assumes that the EWA agencies and potential sellers can overcome these institutional obstacles and that crop idling would be a viable source of water for the EWA.

The adverse effects of crop idling occur because of trade linkages between irrigated production, use of farm inputs, production of farm outputs, and regional economies. Many businesses trade with farmers. Farmers buy inputs from farm stores, equipment supply stores, custom operators, and other farmers; other regional businesses earn their income by transporting, storing, marketing, and processing agricultural products. Idling of crop land reduces the volume of sales for these businesses. These types of effects are often referred to as third-party economic effects.

DWR (2002) suggests that an analysis of third party effects consider the following: the size of the local economy, its dependence on local agriculture, the pre-existing amount of land idling, the amount of normal variation in idling and the agricultural economy, and self-mitigating conditions such as opportunities for re-employment. The EWA agencies consider some of these factors when making land idling acquisitions in order to avoid or decrease adverse effects. (See Section 11.2.3.)

Effects of idling land are typically a small percentage of a large regional economy when the region includes large urban areas such as Sacramento or Stockton. Use of economic data from large regions as a baseline tends to mask the effects of land idling on individual counties or small rural communities. An effect that appears very small relative to an entire economy may seem quite adverse within the most affected areas. Economic effects of crop idling tend to be concentrated within small subgroups of the regional economy; for example, certain agricultural interests in certain locales within a county. At one extreme, if one job were lost, that job loss could be a very adverse effect for one person. A baseline for comparison of adverse effects should, therefore, be based on the smallest possible regional economies.

This analysis describes economic effects at three levels: the regional level, the county level, and the local level. The regional and county-level analyses can use the economic methodology, and baseline acreage and economic data are available for comparison; however, economic methodology and baseline economic data for rural towns and local industries are not available.

The regional and county economic analysis for this document uses a model based on IMPLAN, an input-output (IO) database and modeling routine, with information from recent University of California Cooperative Extension crop budgets for rice and cotton.[8] The analysis estimates the direct agricultural effects of land idling using the crop budget information and estimates indirect and induced effects in individual counties or aggregations of counties with IMPLAN.[9] Indirect effects are caused by expenditures in the region by regional industries, and include purchases of inputs to grow crops and make products. Induced effects are caused by expenditure of household income. The rest of this chapter refers to this model as the Department of Water Resource's Economic Model for Temporary Idling of Irrigated Land (DEIM).

IMPLAN can apply IO models for any county or group of counties. There is no readily available method for developing IO information for local economies within counties. Therefore, the analysis includes a qualitative discussion of economic effects on local economies.

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[8] IMPLAN data were in 1997 dollars. Agricultural input data were adjusted to 1997 levels using the GDP price deflator index.

[9] The regional input-output analysis for this assessment uses detailed UCCE crop budgets to correct for three deficiencies of the IMPLAN data and methods.

- IMPLAN expenditure estimates are based on aggregated crop categories and may not be accurate for individual California crops. This analysis uses the crop budgets, not IMPLAN, to estimate the direct farm expenditure, farm labor income, and employment losses.
- Input-output analysis presumes that all inputs change in fixed proportions to output. Idling does not reduce certain fixed inputs. Therefore, this economic analysis uses changes in variable expenditures from the crop budgets as input to the model.
- Input-output analysis does not automatically count impacts from forward linkages (marketing, transportation, storage, and processing of farm production). This assessment uses data from several sources to estimate direct effects associated with rice milling, storage, and transportation (DWR 2002). Forward linkages for the cotton analysis did not need to be added. Farm costs and revenues carry cotton to the point where it leaves the cotton gin, which is believed to be enough expenditure to fairly represent direct effects in the county (DWR 2002).

The method of combining IMPLAN and crop budget information is described by DWR (2002). Refer to Attachment 1 for further discussion of IMPLAN.

11.2.2.2 Property Tax Revenues

Property tax revenues are determined by property values, tax rates, and the Williamson Act and Open Space Subvention Act. Water transfers could have effects on property values and tax revenues in ways that are not easily measured by IO-type models. Therefore, this analysis handles tax revenue effects qualitatively.

11.2.2.3 Groundwater Pumping Costs

Section 11.2.5.4 briefly addresses potential effects of costs associated with EWA groundwater actions. The EWA Project Agencies may acquire water through various groundwater actions, including groundwater substitution, and groundwater purchase. These EWA groundwater actions, as described in the project description, could lead to diminished groundwater levels which may adversely affect costs associated with groundwater extraction. EWA groundwater storage could increase groundwater levels which could lead to lower extraction costs for nearby groundwater users. Economic effects would occur only to the extent that water is obtained by groundwater substitution.

In general, energy costs for pumping, operations and maintenance, and well development are the main components of the costs associated with groundwater extractions. Pumping costs are directly related to the depth of groundwater tables. If groundwater tables decline, more energy is required for pumping, increasing costs.

11.2.2.4 Water Transfers Market Effects

The objective of the water transfers market analysis is to evaluate the effect of EWA participation in the water market on water transfer prices. The analysis of the water transfers market is generally qualitative. The assessment evaluates factors affecting demand and supply in the market for water transfers. Section 11.2.5.5 discusses how the EWA might affect prices in water transfer markets in California.

11.2.3 Environmental Measures Incorporated into the Project

Most of the adverse economic effects of crop idling occur because of trade linkages between irrigated production and regional economies. Many businesses trade with farmers. Farmers buy inputs from farm stores, equipment supply stores, custom operators, and other farmers; other regional businesses earn their income by transporting, storing, marketing and processing agricultural products. Idling of crop land reduces the volume of this business.

In order to avoid or decrease third-party economic effects, the EWA would incorporate the following measures as part of the program definition.

1. EWA agencies would not purchase water via crop idling if more than 20 percent of recent harvested rice or cotton acreage in the county would be idled through EWA water acquisitions. (Refer to Section 11.2.8 for discussion of additional water acquisition programs. The EWA would idle less than 20 percent if other reasonably foreseeable transfers under other programs are idling land.)

To determine the recent harvested acreage, the EWA Project Agencies would consider the number of acres of rice and cotton harvested in each county during the 5 years previous to the transfer. If, in the year immediately prior to the transfer, harvested acreage in each county was within 5 percent of the mean harvested acreage of the county of all 5 previous years, then the amount of rice or cotton acres harvested in the prior year would be used to determine the basis for 20 percent crop acreage. If acres harvested during the year immediately prior to the transfer were not within 5 percent of the mean, then the calculated mean would be used to determine the basis for 20 percent crop acreage.

EWA Project Agencies would gather accurate data regarding the amount of crop acreage previously harvested and idled in participating counties. The data are available from DWR Land Use Surveys, the USDA, and county crop reports. This information would be confirmed by the local Farm Bureau, local UCCE offices, the Agricultural Commissioners Office, or other crop-specific authorities.

Refer to Section 11.2.3.1 for further explanation of the 20 percent crop idling measure incorporated into the project.

2. EWA agencies would also acquire less water by crop idling when the level of land idling is already larger than historically normal.

   Economic effects are related to background conditions as well as the amount of land idling. One of these conditions is the amount of land idling caused by other factors such as drought, low agricultural prices, or other water transfers. The negative economic effects of land idling are exacerbated when an unusual amount of land is already being idled. Therefore, idling less land in a local area when the amount of land idling is already more than historically normal would lessen economic effects.[10] Refer to Section 11.2.8 for discussion of additional water acquisition programs.

11.2.3.1 Considerations Regarding Socioeconomic Effects

EWA agencies incorporated the 20 percent crop idling measure into the project to reduce potential effects on the regional and agricultural economies. Water Code Section 1745.05(b) and the large variation in historical acreage and the intentional, voluntary fallow from Federal farm programs suggest precedent for the 20 percent crop idling measure.

Water Code Section 1745.05 (b) requires a public hearing under some circumstances where the amount of water made available for land idling exceeds 20 percent of the water that would have been applied or stored absent the water transfer. Presumably, third parties would be able to attend the hearing and could argue to limit the transfer based on its economic effects.

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[10] The local area is defined as a small local economy consisting of a town and closely allied outlying residences and businesses.

The agricultural industry experiences normal variation in crop acreages and agricultural economies are adapted to address this variation. Table 11-23 shows cotton and rice acreage in counties of interest from 1990 to 2000.

Table 11-23 shows that both cotton and rice acreage is quite variable. For both crops, the standard deviation of acreage is about 15 percent of the average. As of 2000, cotton acreage had been below average for 3 years. This trend probably reflects poor cotton prices in these years. For rice, acreage in the 4 years before 1994 was considerably less than average. The lower acreage was probably caused by drought, by DWR's Drought Water Bank, and by rice acreage reduction provisions in these years. Since 1994 there has been relatively little variation in rice acreage. If the effects of idling rice and cotton can be judged by historical precedent in the 1980s and early 1990s, then there is much precedent for land idling up to 15 percent of acreage historically used for these crops.

Table 11-23
Acreage of Cotton and Rice in Counties of Interest, 1990 to 2000

Year	Cotton		Rice	
	1000 acres	*Difference from Mean*	*1000 acres*	*Difference from Mean*
1990	1,071	115	342	-71
1991	948	-9	292	-121
1992	1,023	67	342	-71
1993	1,055	99	387	-26
1994	1,057	100	445	32
1995	1,134	178	432	19
1996	1,058	101	447	34
1997	942	-14	460	47
1998	715	-242	441	28
1999	730	-227	461	48
2000	787	-170	492	80
Average	956		413	
Standard Deviation	147.8		62.8	
As % Mean	15.5%		15.2%	

Source: CASS California Agricultural Statistical Service

Counties of interest for cotton are Fresno, Kern, Kings, and Tulare. For rice acreage, includes Butte, Colusa, Glenn, Placer, Sutter, and Yolo Counties. Acreage does not include acreage for seed.

Acreage reduction provisions (ARPs) under Federal farm programs were an important cause of intentional idling of rice and cotton before 1991. These provisions required participating farmers to idle a given share of their rice or cotton land in order to receive program benefits. Historically, about 50 to 75 percent of cotton acreage and 95 percent of rice acreage participated in the programs (Mann and Moore 1993). The mandatory acreage reduction for rice was 20 percent or more in every year from 1984 to 1990, reaching 35 percent in 1986 and 1987 (Green 1990). For cotton, the ARP was 20 percent or more in every year from 1983 to 1990 except 1988 and 1990 (12.5 percent

in both years). With voluntary acreage reduction provisions and improved market conditions, the ARPs were reduced after 1991. The 1996 Farm Bill (the Federal Agriculture Improvement and Reform Act) eliminated the ARPs entirely. However, the large, voluntary acreage reduction established under the ARPs created a precedent to idle up to 20 percent of rice and cotton.

This analysis only describes the economic effects of idling 20 percent of rice and cotton acreage in the identified counties. CEQA and NEPA do not require this analysis to make a judgment on adverse effects relative to a specific threshold. Several other studies have, however, assessed the adversity of actions similar to those that the EWA agencies would take (Table 11-24).

Table 11-24
Information from Other Studies Related to Socioeconomic Effects for Land Idling

Example/Source	*Action*	*Results*	*Substantial/Not Substantial*
Draft report by USBR – "Economic Impacts of Fallowing Irrigated Land in the Imperial Irrigation District" (2001)	5% Reduction in county water supply	County employment reduced by 0.1%; county economic activity (output) reduced by 0.2%	Effects considered not substantial
Yolo County – "California Water Transfers, Gainers and Losers in Two Northern Counties" (1992)	16% reduction in county water supply (154,323 acre-feet) from Drought Water Bank (DWB)	County employment reduced by 0.6%; agricultural related income down 5%	Farmers felt that effects were not substantial (they were being compensated); community leaders felt that it was substantial (initiated lawsuit).
"California's 1991 DWB, Economic Impacts in Selling Regions" – Rand Report (1993)	DWB water transfers made available a total of 820,805 acre-feet of water from 13 California counties	Reduction in agricultural related income was "not large" compared to variation experienced in 1980's; no relationship found between DWB effects and overall county economies.	Effects considered not substantial
"Agriculture-to-Instream and Urban Water Transfers in the Central Valley of California: An Economic Reality Check" – CH2M HILL (1998)	Transfer of 1 MAF from Central Valley irrigation use to instream and urban uses	Net personal income reduced by $170 for every AF water transferred and 8 jobs lost for every 1 thousand acre-feet (TAF) water transferred. Total effects are 2% to 3% of regional total.	Not substantial regionally, but effects could be more concentrated in a few areas of origin.
"Water Marketing in California. Resolving Third-Party Impact Issues" – David Mitchell (1992)	Water transfers (in general)	"Impacts are well within the range of ordinary economic consequences that arise from changing circumstances in a market economy."	Effects considered not substantial

11.2.4 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative represents future conditions during Stage 1 of CALFED if the EWA were not implemented. In general, agricultural economies would not likely change in the future. Farmers would continue to idle some land temporarily and would continue to rotate other previously idled land back into production as common land management practices and in response to market issues,

and as a result of water supply shortages. These farming practices cause normal variations in total value of output, value added, wages and salaries, and employment. The conditions under the No Action/No Project Alternative generally reflect the conditions described in the Affected Environment/Existing Conditions section. This analysis further refers to the Affected Environment/Existing Conditions as the Baseline Condition.

Several CALFED and other government-sponsored programs would retire irrigated land for restoration and habitat purposes, reducing agricultural land. Section 11.2.8, Cumulative Effects, discusses these potential effects.

11.2.5 Environmental Consequences/Environmental Impacts of the Flexible Purchase Alternative

The Flexible Purchase Alternative allows transfers up to 600,000 acre-feet each year and does not specify transfer limits from the Upstream from the Delta Region or the Export Service Area. Transfers from the Upstream from the Delta Region would range from 50,000 to 600,000 acre-feet each year, depending on hydrologic year type and excess conveyance capacity through the Delta each year. Even though all potential transfers would not occur in some years, this section assumes the 600,000 acre-feet level in order to discuss the maximum economic effects for the transfer scenario. Therefore, the crop idling acreages indicated in the analysis represent maximum crop idling actions and would not likely occur in any one year.

11.2.5.1 Upstream from the Delta

The county-level analysis includes Butte, Glenn, Colusa, Placer, Sutter, and Yolo Counties. These counties all have large amounts of rice acreage and various water agencies that have expressed some willingness to sell water to the EWA (refer to Chapter 2). Shasta and Solano Counties produce no or little rice; therefore, the analysis excludes them (CASS 2001). Tehama and Sacramento Counties do not produce enough rice acreage to provide a significant contribution to the water supply needs of the EWA and were also omitted. Furthermore, the analysis excludes Sacramento County because of its expansive baseline economy, which, if included, would dilute any economic effects. Although Yuba County had over 36,000 acres of rice in 2000, Yuba County Water Agency has stated that it would not participate in crop idling water transfers with the EWA. Any rice acreage in Yuba County outside of the Yuba County Water Agency boundaries would not be a significant source of water for the EWA. Therefore, the county analysis does not include idling in Yuba County. Yuba County was included in the regional analysis with the other six counties because the rice mills in Yuba County serve multiple counties within the region (Davis 2002).

11.2.5.1.1 Regional Analysis

The regional analysis evaluates changes in economic activity that result from idling rice acreage. The region is defined as Butte, Colusa, Glenn, Placer, Sutter, Yolo and Yuba Counties. The IMPLAN data set (1997) provides baseline value of output, value

added, wages and salaries, and employment data for this analysis. Value of output is value of production. Value added consists of wages and salaries, proprietor's and property incomes, dividends and interest, and indirect business taxes. Employment is the number of jobs at industries in the region and is measured in full-time job equivalents.

The Upstream from the Delta Region analysis considers only rice for idling. Of all common crops, rice provides the largest amount of water per acre idled, approximately 3.3 AF of ETAW per acre.[11] In past and recent water transfer programs and agreements, rice farmers have enrolled their crop for idling. Therefore, rice farmers would represent a potential seller to the EWA.

Table 11-25 summarizes the baseline conditions for the region. These data are from the 1997 IMPLAN data set. IMPLAN accounting conventions differ slightly from some other common economic data measurement standards.[12] Placer and Yolo Counties, which include some urban areas near Sacramento, contribute most to the baseline economy of the region.

Table 11-25
Baseline Conditions – Upstream from the Delta Region(1), 1997 dollars

	Value of Output, Million $	Value Added, Million $	Employment, Jobs	Wages and Salaries, Million $
Baseline	32,395	19,157	408,410	10,389

Source: 1997 IMPLAN Data Set

(1) Counties included are Butte, Colusa, Glenn, Placer, Sutter, Yolo, and Yuba.

Economic effects would occur only to the extent that water is obtained by land idling (see Section 11.2.7). Effects would occur only in years when the crop idling actions take place and effects would be less when less land is idled. Therefore, the average effect of a land idling scenario over a number of years would be less than the effects described below.

EWA acquisition of water via crop idling of rice acres in the Upstream from the Delta Region would decrease net revenues to some tenant farmers whose landowners choose to participate in the EWA.

Tenant farmers, those who rent land from property owners, could be adversely affected by the crop idling. The landowner would receive revenues from the sale of the water instead of rent from the tenant, but the tenant farmer would not receive the

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11 3.3 AF/acre is the estimated evapotranspiration of applied water (ETAW) per acre for rice used in the economic analysis. Evapotranspiration is total water loss due to free-water evaporation, plant transpiration, and soil-moisture evaporation. ETAW is the portion of the total evapotranspiration that is provided by irrigation as opposed to precipitation. DWR calculates normal year ETAW values using information and methodologies from established sources. ETAW is the commonly accepted measure of surface water savings due to crop shifting or idling (Water Transfers Office 2002).

12 Bureau of Economic Analysis (BEA) Commodity Classifications, which form the basis of the IMPLAN technical matrix, can vary from Standard Industrial Classifications.

net revenue from rice production. If there is no other land available for rent, or if land rents are increased, the tenant farmer would be worse off.

For several reasons, this type of effect may be the exception rather than the rule. Full owners operated about 65 percent of farms in the Upstream from the Delta Region in 1997 (USDA 1999) and part owners operated most of the remaining farms. Tenant farmers may be able to rent other parcels of land or engage in alternative economic activity. A tenant farmer could also be an owner of some land. In other cases, tenants could have formal or informal agreements with landowners that would result in sharing of the water transfer revenue.

EWA acquisition of water via crop idling of rice acres in the Upstream from the Delta Region would increase net revenues to individual farmers/landowners participating in the EWA.

Land enrollment in the EWA program is voluntary and farmers would be paid to participate. If farmers participate, the expected net return from the water transfer must exceed the expected net return from growing the crop to be idled, so farmers expect to be better off. If they do not participate, they are no worse off, at least with respect to their own farming decision.

The economics of participation for a representative farm can be shown using results from DEIM. DEIM models a representative farm using 1995 to 1999 agricultural prices and recent farm production costs (DWR 2002). Table 11-26 compares the net revenues gained by the water transfer in DEIM to the revenue lost from discontinued rice production. The model assumes the farmer receives $50 for each acre-foot, after water costs, for water made available by idling rice land. DEIM found that this price should be sufficient to compensate rice landowners for their net revenue losses under 1995 to 1999 conditions.

Rice provides 3.3 acre-feet ETAW of water per acre when idled; therefore, the farmer would receive $165 per acre of rice idled under the DEIM price. Various land idling expenses would offset some of this income. The farmer would forego all rice production, and would give up the value of the crop sales less variable costs avoided (DWR 2002). Under current farm program rules, farmers obtain a government payment per acre of rice land enrolled in the commodity program in any case. Therefore, temporary participation in water transfers will not affect the government payment.

Table 11-26
Net Revenue From Water Transfer, Lost Revenue, Variable Costs Avoided and Lost Return Over Variable Costs, 1997 dollars
(Dollars per Acre)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
County/Crop	*Water Transfer Price, $/AF*	*Net Revenue from Water Transfer*	*Revenue from Crop Production (lost)*	*Variable Costs Avoided by the Transfer*	*Net Revenue from Crop Production (lost) (3) - (4)*	*Net Revenue gained from Water Transfer (2) – (5)*
Butte/Rice	50	128	641	552	89	39
Colusa/Rice	50	130	616	551	64	66
Glenn/Rice	50	128	656	656	98	30
Placer/Rice	50	131	530	542	-12	143
Sutter/Rice	50	130	614	547	67	63
Yolo/Rice	50	129	627	554	72	57

Source: DWR 2002.

(1) The model assumes the farmer/land owner receives $50 for each acre-foot made available by idling rice land. Water transfer prices are net to farmer after water costs are paid.
(2) Net Revenue from Water Transfer is the water transfer revenue less costs required when land is idled. Land idling costs differ slightly among counties (DWR 2002).
(3) Revenue from Crop Production is value that the crop would have produced, not including direct government payments.
(4) Variable Costs Avoided by the Transfer are farming costs that would be avoided if the land were idled.
(5) = (3) – (4). Net Revenue from Crop Production equals Revenue from Crop Production minus Variable costs of crop production, or, the revenue that the farmer would have received by producing crops on the land, for example, it is negative if variable costs avoided by the transfer exceed lost revenue from crop production.
(6) = (2) – (5). Net Revenue gained from Water Transfer equals Net transfer revenue minus Lost Net Revenue from Crop Production.

As Table 11-26 shows, the net revenue received per acre from a water transfer (2) is larger than the net revenue received from crop production (5). The water transfer price could be even less than $50 per acre-foot, and the transfer would still provide a positive net revenue to the farmer.

It should be noted that $50 per acre foot is a representative price used for modeling and would likely vary according to hydrologic conditions and prices in agricultural markets. Table 11-32 provides sensitivity analysis of economic impacts at higher prices.

EWA acquisition of water via crop idling of rice acres in the Upstream from the Delta Region would decrease the total value of output, value added, wages and salaries, and employment in the region.

Farmers selling water to the EWA from idled land would be compensated for expected losses in net income from not growing rice; however, indirect and induced effects create losses for persons who trade with farmers.

Table 11-27 summarizes the total annual effects per acre of idling rice in the Upstream from the Delta Region estimated from DEIM. In the rice idling action, if one acre of rice were idled, there would be a $2,488 decrease in total value of output, a $960 decrease in value added, a $499 decrease in wages and salaries, and 25 jobs lost.

Again, these effects would take place only in years when the crop idling actually occurs. Land idling actions would not occur every year. As the actions occur less frequently, the average annual effect becomes less. For example, if a scenario results in a 1 percent loss in output, but the idling would actually occur only once every 3 years, then the average annual loss in output would be only one-third of 1 percent.

Table 11-27
Value of Output, Value Added, Wages and Salaries, and Employment - Total Effect of Idling Rice per Acre In Upstream from the Delta Region, 1997 dollars

Upstream from the Delta Region Action	*Value of Output $/acre*	*Value Added $/acre*	*Wages and Salaries $/acre*	*Employment # of jobs/1000 acres*
Rice Idling [1]	-$2,488	-$960	-$499	-25

Source: DEIM 2002

[1] Results are specific to the distribution of acreages across counties described in the county analyses. The per-acre regional effects would change when the county acreage distributions change.

Table 11-28 shows the regional effects of acquiring water by idling rice. The effects are expressed as a percentage change to the baseline conditions in Table 11-25. If 89,600 rice acres were idled, it would cause a less than one percent effect to the region's economy as measured by four key parameters. The effect on the region's rice economy or even the region's agricultural economy would be larger on a percentage basis; however, there are no standard measures for the size of the rice or agricultural economies in a region. Section 11.2.5.1.3 discusses local effects.

Table 11-28
Description of Potential EWA Rice Idling Action Upstream from the Delta Region

Total Acres	*Action*	*Maximum Idled Acres*	*Portion of Total Rice Acres*	*Change in Output Relative to Baseline[1]*	*Change in Value Added Relative to Baseline[1]*	*Change in Wages and Salaries Relative to Baseline[1]*	*Change in Employment Relative to Baseline[1]*
448,158	Rice Idling	89,600	20.0%	-0.69%	-0.45%	-0.43%	-0.54%

Source: DEIM 2002

[1] Percentages represent reductions to baseline values. The percentages translate into the following dollar losses to the four parameters: total value of output would decrease by $222.9 million, value added would decrease by $86.0 million, wages and salaries would decrease by $44.8 million and 2218 jobs would be lost.

11.2.5.1.2 County Analysis

The county analysis describes changes in county value of output, value-added, wages and salaries, and employment to individual counties that result from idling rice acreage. Effects to individual landowners and tenant farmers were described qualitatively in Section 11.2.5.1.1. Table 11-29 describes the baseline conditions in the counties in which rice idling might occur.

Table 11-29
Upstream from the Delta Region County Baseline Conditions, Million 1997 $ and Jobs

County	Value of Output Baseline	Value Added Baseline	Wages and Salaries Baseline	Employment, Jobs Baseline
Butte	6,319	3,803	2,063	96,329
Placer	11,081	6,506	3,258	125,480
Colusa	1,085	456	212	10,781
Glenn	1,071	504	254	12,308
Sutter	2,707	1,606	780	38,201
Yolo	8,365	5,064	3,081	98,433

Source: 1997 IMPLAN Data set

Economic effects would occur only to the extent that water is obtained by land idling. (See Section 11.2.7 for explanation of crop idling amounts during wet and dry years.) Effects would occur only in years when the crop idling actions take place, and effects would be less when less land is idled. Therefore, the average effect of a crop idling scenario over a number of years would be less than the effects described below.

EWA acquisition of water via crop idling of rice acres in Butte, Colusa, Glenn, Placer, Sutter, and Yolo Counties would decrease total value of output, value added, wages and salaries, and employment in each county.

Table 11-30 summarizes the total effects per acre of idling rice land, as estimated by DEIM. There is variation among counties because some counties do not have operating rice mills and some counties have more economic leakage[13] than other counties. Most of the job losses involve agricultural services, on-farm employment and rice milling, if mills operate in the county.

Table 11-30
Total County Effect of Idling Rice, 1997 dollars

County	Value of Output $/acre	Value Added $/acre	Wages and Salaries $/acre	Employment # of jobs/1000 acres
Butte	-$2,777	-$1,093	-$543	-30
Colusa	-$1,982	-$628	-$357	-18
Glenn	-$1,332	-$584	-$323	-23
Placer	-$1,441	-$653	-$335	-19
Sutter	-$1,563	-$647	-$361	-22
Yolo	-$2,455	-$931	-$530	-23

Source: DEIM 2002

The section below describes the potential effects of EWA water acquisition through rice idling. As Section 11.2.3.1 explained, no more than 20 percent of baseline rice acreage would be idled under EWA water acquisitions.

This scenario includes approximately 89,600 acres of rice land idling. The following economic effects are calculated from DWR's DEIM model using the per-acre estimates

[13] Leakages are out-shipments of money from a local economic region, mostly payments made to non-local residents for goods, materials and production factors that are used in the region, but are brought in from outside the region.

described in Table 11-30. Table 11-31 presents these dollar amounts as a percentage loss to the baseline values.

- Idling 19,000 rice acres in Butte County would result in a $52.8 million total decrease in value of output, a $20.8 million decrease in value added, a $10.3 million decrease in wages and salaries, and a loss of 570 jobs.
- Idling 26,460 rice acres in Colusa County would result in a $52.4 million total decrease in value of output, a $16.6 million decrease in value added, a $9.4 million decrease in wages and salaries, and a loss of 476 jobs.
- Idling 16,750 rice acres in Glenn County would result in a $22.3 million total decrease in value of output, a $9.8 million decrease in value added, a $5.4 million decrease in wages and salaries, and a loss of 385 jobs.
- Idling 3,280 rice acres in Placer County would result in a $4.7 million total decrease value of output, a $2.1 million decrease in value added, a $1.1 million decrease in wages and salaries and a loss of 62 jobs.
- Idling 19,340 rice acres in Sutter County would result in a total of $30.2 million decrease in value of output, a decrease of $12.5 million in value added, a decrease of $7.0 million in wages and salaries, and a loss of 425 jobs.
- Idling 4,770 rice acres in Yolo County would result in an $11.7 million total decrease in value of output, a $4.4 million decrease in value added, a $2.5 million decrease in wages and salaries and a loss of 110 jobs.

Table 11-31
Economic Effects of Alternative Rice Idling Action in Counties in the Upstream from the Delta Region

	Maximum Rice Idling Action			***Percent Economic Effect[2]***			
County	***Total Rice Acres[1]***	***Maximum Idled Acres***	***% of Total Acres Idled***	***Value of Output***	***Value Added***	***Wages and Salaries***	***Employment***
Butte	95,120	19,000	20.0%	-0.84%	-0.55%	-0.50%	-0.59%
Colusa	132,338	26,460	20.0%	-4.83%	-3.64%	-4.46%	-4.42%
Glenn	83,777	16,750	20.0%	-2.08%	-1.94%	-2.13%	-3.13%
Placer	16,379	3,280	20.0%	-0.04%	-0.03%	-0.03%	-0.05%
Sutter	96,722	19,340	20.0%	-1.12%	-0.78%	-0.91%	-1.11%
Yolo	23,822	4,770	20.0%	-0.14%	-0.09%	-0.08%	-0.11%
Total	448,158	89,600	20.0%				

Source: DEIM 2002

(1) The figures representing total rice acres within the counties are based on a five-year average to take into account any recent land trends in rice production. The data is taken from the County Agricultural Commissioners Reports from 1995 to 1999.
(2) These percentages represent reductions to baseline values.

The economic effects of water transfers from rice land would vary depending on many conditions. Table 11-32 shows the effects per acre of idling rice in Colusa and Glenn Counties at higher water prices of $75 and $100. The county-level negative effects of idling rice become smaller as the price of water increases. At higher prices,

the water transfer revenue would provide more offset to the negative effects of idling. The overall negative effect of crop idling to output, value-added, wages and salaries, and employment, however, does not appear to be very sensitive to the price of water.

Farmers would likely spend a percentage of the increased net revenue received from a water transfer in their local economy. Farmers may decide to invest in new equipment for the farm, increasing revenue for the agricultural sector, or they may choose to spend money in the trade, services, finance, or other sectors of the economy. This would result in higher sales for these sectors. The analysis of the effects of water price changes show that the spending boost provided by increased net revenues from water transfers would not offset the negative effects from land idling. As Table 11-32 indicates, in Colusa County, a $50 increase in farmer's net revenue would only lessen the reduction to total output by $153.

Table 11-32
Total County Effect of Idling Rice in Colusa and Glenn Counties Under Different Water Prices, 1997

County	Price of Water to Farmer ($/AF)	Value of Output $/acre	Value Added $/acre	Wages and Salaries $/acre	Employment # of jobs/1000 acres
Colusa	$50	-$1,982	-$628	-$357	-18.5
	$75	-$1,905	-$602	-$345	-17.8
	$100	-$1,829	-$575	-$333	-17.1
Glenn	$50	-$1,332	-$584	-$323	-22.8
	$75	-$1,252	-$559	-$312	-22.1
	$100	-$1,171	-$535	-$302	-21.4

Water transfer prices are net to farmer after water costs are paid.

Source: DEIM 2002.

11.2.5.1.3 Local Analysis

The following is a qualitative discussion of local third-party economic effects. For this analysis, local effects mean effects on towns, communities and local industries. Local economic data do not exist for all communities, and the locations of EWA rice land idling within counties cannot be predicted with certainty. Therefore, this analysis does not attempt to predict economic effects in specific communities, and the analysis of local effects is handled descriptively and qualitatively. In the future, experience will allow the EWA agencies to anticipate where most adverse local effects might be.

The effects of the rice idling action described above are changes in value of output, value added, wages and salaries, and employment at the regional or county levels. Large urban centers in some counties create large baseline economic values. Rural communities have a much smaller economic base, and any change to economic levels would be more adverse relative to the larger regional and county economies. Even if a community were not adversely affected, some persons within the community may be affected.

The majority of rice fields in the Upstream from the Delta Region are along the Interstate-5 corridor in Glenn and Colusa Counties, between the I-5 and Highway-99 corridors in Butte and Sutter Counties, and in western Placer County. Most of the

communities in these areas are small and dependent on agriculture. Some of the agriculturally based communities include Artois and Willows in Glenn County; Maxwell, Arbuckle, and Grimes in Colusa County; Richvale and Biggs in Butte County; and numerous others. These towns often house companies associated with rice production, such as seed and fertilizer suppliers, aerial application services, rice mills, and rice driers and storage warehouses that rely on rice production for revenue. These companies also provide employment to many local residents.

Interviews with several managers and operators of rice mills, aerial application services, and rice storage warehouses indicated that the companies are volume driven. If rice production is reduced, adverse effects occur. Aerial applications and other custom operations would not occur on idled lands, resulting in a loss of revenue. Fertilizer, herbicide, and seed companies would also lose sales if farmers did not plant rice. Furthermore, rice idling would reduce the demand for haulers and harvest equipment operators. Equipment rentals and fuel sales would decrease as well (Hoff 2002).

Idling rice land would cause a decrease in revenue and employment for many companies involved in rice production. These effects would generally be adverse to both business owners and employees. Decreased revenue and employment at rice mills would result in less local spending.

The adverse effects are likely to be larger if the idled land is near a local community far from any large urban center, because a larger share of expenses is likely to be paid to local businesses. Residents of rural communities far from urban centers typically spend larger portions of their incomes within the community than residents of rural communities that are close to large urban centers.

Leakages are out-shipments of money; for example, payments made to non-residents for imported goods, materials, and production factors. The share of income or revenue that becomes leakage is generally larger when there are more shopping opportunities outside the local community. Therefore, the adverse effects of land idling would be larger for land that is close to communities located far from urban centers.

Farmland owners would realize a net gain in net revenue by selling water to the EWA, as described above. Presumably, farmers or landowners would spend some of their increased net revenues in the local economy. This effect could offset some of the decrease in local spending by the third parties described above. The analysis of the effects of water price changes in Table 11-32 suggests that the spending boost provided by increased net revenues from water transfers will not offset the negative effects from land idling.

11.2.5.2 Export Service Area

The Export Service Area analysis includes Fresno, Tulare, Kings and Kern Counties. In this analysis, the region does not include southern California. Stanislaus and San Joaquin Counties produce very little, if any, cotton. Although Madera and Merced Counties have cotton crops, water agencies in these counties are not selling water or are only selling groundwater supplies to the EWA; therefore, these counties were also excluded from the analysis. Fresno, Kern, Kings, and Tulare Counties all have large amounts of cotton acreage and water agencies that have expressed some interest in selling water to the EWA. Therefore, EWA actions may affect these counties.

11.2.5.2.1 Regional Analysis

The regional analysis evaluates changes in value of output, value-added, wages and salaries, and employment that would result from idling cotton. This analysis considers only cotton for idling in this region because cotton farmers in the Export Service Area have shown willingness to sell water to the EWA. (Refer to Chapter 2 for further discussion.) Cotton provides approximately 2.3 acre-feet ETAW of water per acre idled.[14]

The models for Fresno, Tulare, Kings and Kern Counties assume that only upland cotton would be idled in these counties. EWA agencies are not planning to purchase water though idling pima and other cotton varieties. Therefore, the regional and county analysis does not include potential idling of pima cotton and other varieties.

Table 11-33 summarizes the baseline conditions of the region. These data are from the 1999 IMPLAN data set for Fresno, Kern, Kings and Tulare Counties.

Table 11-33
Baseline Conditions – Export Service Area, 1997 dollars

	Value of Output, Million $	*Value Added, Million $*	*Employment, Jobs*	*Wages and Salaries, Million $*
Baseline	70,494	40,754	924,468	22,009

Export Service Area include Fresno, Kern, Kings, and Tulare Counties.
Source: 1999 IMPLAN data set. IMPLAN accounting conventions differ slightly from some other common economic data measurement standards.

Economic effects would occur only to the extent that water is obtained by crop idling. (See Section 11.2.7 Comparative Analysis.) Effects would occur only in years when EWA agencies acquire water through crop idling actions, and effects would be less when less land is idled. Therefore, the average effect of a crop idling scenario over a number of years would be less than the effects described below.

[14] 2.3 AF/acre is the estimated ETAW for cotton used in the economic analysis. Refer to footnote 2 in section 11.2.3.1.1 for further definitions.

EWA acquisition of water via crop idling of cotton acres in the Export Service Area would decrease net revenues to some tenant farmers whose landowners choose to participate in the EWA.

Tenant farmers, those who rent land from property owners, could be adversely affected by the EWA crop idling actions. The landowner would receive revenues from the sale of the water instead of rent from the tenant, but the tenant farmer would not receive the net revenue from cotton production. If there is no other land available for rent, or if land prices are increased, the tenant farmer would be worse off.

For several reasons, this type of effect may be the exception rather than the rule. Full owners operated about 73 percent of farms in the Region in 1997 (USDA 1999) and part owners operated about 16 percent. Tenant farmers operated only about 11 percent of farms in the region. Tenant farmers may be able to rent other parcels of land or engage in alternative economic activity. A tenant farmer could also be an owner of some land. In other cases, tenants could have formal or informal agreements with landowners that would result in sharing of the water transfer revenue.

EWA acquisition of water via crop idling of cotton acres in the Export Service Area would increase net revenues to farmland owners participating in the EWA.

Land enrollment in the EWA program is voluntary and farmland owners would be paid to participate. If farmland owners participate, the expected net return from the water transfer must exceed the expected net return from growing the crop to be idled, so farmers expect to be better off. If they do not participate, they are no worse off, at least with respect to their own farming decision.

DEIM results can show the economics of participation for a representative farm. DEIM models a representative farm using 1995 to 1999 agricultural prices and recent farm production costs (DWR 2002).

Table 11-34 compares the net revenues gained by the water transfer to the net revenue lost from discontinued cotton production. The model assumes that the farmer receives $150 per acre-foot of water idled in Kern and Tulare Counties, $120 in Kings County and $200 per acre-foot in Fresno County. DEIM suggests that these prices should be sufficient to induce landowners to participate. The analysis assumes that cotton net returns in Fresno County may be higher than other counties evaluated; however, individual lands vary in capability, and these assumptions may not apply to lands entering the EWA Program. The EWA agencies may not be willing to pay different amounts in each county.

Cotton provides about 2.3 acre-feet of water per acre when idled. Under prices assumed by the model, the farmer would receive $345 per acre of cotton idled in Kern and Tulare, $276 in Kings County, and $460 in Fresno. Various land-idling expenses, such as certain machinery costs, petroleum, material and custom costs, would offset some of this income (DWR 2002). The farmer would forego all cotton production, and

would give up the value of the crop sales less variable costs (DWR 2002). Table 11-34 shows that the transfer revenues are sufficient to compensate the farmer for losses in net returns from cotton production.

Table 11-34
Net Revenue From Water Transfer, Lost Revenue, Variable Costs Avoided and Lost Return Over Variable Costs, Dollars per Acre, Export Service Area, 1997 dollars

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
County/Crop[7]	*Water Transfer Price, $/AF*	*Net Revenue from Water Transfer*	*Revenue from Crop Production (lost)*	*Variable Costs Avoided by the Transfer*	*Net Revenue from Crop Production (lost) (3) – (4)*	*Net Revenue gained from Water Transfer (2) – (5)*
Fresno/Cotton	200	402	1035	634	402	0
Kern/Cotton	150	287	900	634	266	21
Kings/Cotton	120	218	797	634	163	55
Tulare/Cotton	150	287	857	634	223	64

(1) Water transfer prices are net to farmer after water costs are paid.
(2) Net Revenue from Water Transfer is the water transfer revenue less costs required when land is idled. Land idling costs differ slightly among counties (DWR 2002).
(3) Revenue from Crop Production is value that the crop would have produced, not including market transition payment (government payment).
(4) Variable Costs Avoided by the Transfer are farming costs that would be avoided if the land were idled.
(5) = (3) – (4). Net Revenue from Crop Production equals Revenue from Crop Production minus Variable costs of crop production, the revenue that the farmer would have received by producing crops on the land (It is negative if variable costs avoided by the transfer exceed lost revenue from crop production).
(6) = (2) – (5). Net Revenue gained from Water Transfer equals Net Transfer Revenue minus Lost Net Revenue from Crop Production.
(7) Revenues and costs apply to upland Acala cotton.

EWA acquisition of water via crop idling of cotton acres in the Export Service Area would decrease the total value of output, value added, wages and salaries, and employment in the region.

Farmers selling water to the EWA from idled land would be compensated for their expected losses in income; however, indirect and induced effects would still occur. Table 11-35 summarizes the regional economic effects of idling an acre of upland cotton estimated from DEIM.

Table 11-35
Value of Output, Value Added, Wages and Salaries and Employment - Total Regional Effect of Idling Cotton, 1997

Export Service Area Action	*Value of Output $/acre*	*Value Added $/acre*	*Wages and Salaries $/acre*	*Employment # of Jobs/1000 Acres*
Cotton Idling Action	-$1,613	-$454	-$284	-15

Results are specific to the distribution of acreages across counties as described in the county analysis (Section 11.2.5.2.2). The per-acre regional effects would change when the county acreage distributions change due to the different economies of the counties.

Source: DEIM 2002

Table 11-36 shows the regional effects of acquiring water through cotton idling. In this scenario, 20 percent of total regional cotton acres would be idled. The effects are expressed as a percentage reduction to baseline conditions in Table 11-31. The total effects of idling 182,800 cotton acres in the region would be a $294.9 million total decrease in value of output, an $82.9 million decrease in value added, a $51.9 million

decrease in wages and salaries and 2,806 jobs lost. These EWA effects represent less than one-half of 1 percent of the regional economy. Section 11.2.5.2.3 addresses effects on local economies.

Table 11-36
Description of EWA Cotton Idling Actions in Export Service Area

Total Acres	Action	Maximum Idled Acres	Portion of Total Cotton Acres	Change in Output Relative to Baseline[1]	Change in Value Added Relative to Baseline[1]	Change in Wages and Salaries Relative to Baseline[1]	Change in Employment Relative to Baseline[1]
914,719[2]	Cotton Idling	182,800	20.0%	-0.42%	-0.20%	-0.24%	-0.30%

Source: DEIM 2002

(1) Percentages represent reductions to baseline values.
(2) Total cotton acreage include upland, pima and other cotton varieties planted in Fresno, Kern, Kings and Tulare Counties.

Farmers would likely spend a percentage of the increased net revenue received from the water transfer in their local economy. Farmers may decide to invest in new equipment for the farm, increasing revenue for the agricultural sector, or they may choose to spend money in the trade, services, finance, or other sectors of the economy. This would result in higher sales for these sectors. Analysis of the effects of water price changes suggests that the spending boost provided by increased net revenues from water transfers would not offset the negative effects from land idling.

11.2.5.2.2 County Analysis

The county analysis evaluates changes in value of output, value-added, wages and salaries, and employment to individual county economies that results from idling cotton. Effects to individual landowners and tenant farmers were described qualitatively in Section 11.2.5.2.1. Table 11-37 describes the baseline conditions in the counties in which cotton idling might occur.

Table 11-37
Export Service Area County Baseline Conditions, 1997dollars

County	Value of Output, Million $ Baseline	Value Added, Million $ Baseline	Wages and salaries, Million $ Baseline	Employment, jobs Baseline
Fresno	31,803	18,139	9,883	416,932
Kern	23,988	14,436	7,669	305,432
Kings	3,842	2,253	1,298	47,756
Tulare	12,132	6,652	3,554	171,036

Source: 1999 IMPLAN Data set

Economic effects would occur only to the extent that water is obtained by land idling (see Section 11.2.7). Effects would occur only in years when the crop idling actions take place, and effects would be less when less land is idled. Therefore, the average effect of a land idling scenario over a number of years would be less than the effects described below.

EWA acquisition of water via crop idling of cotton acres in Fresno, Kern, Kings, and Tulare Counties would decrease total value of output, value added, wages and salaries, and employment in each county.

Table 11-38 summarizes the economic effects per acre of idling cotton on value of output, value added, wages and salaries, and employment, as determined by DEIM.

Table 11-38
Total County Effect of Idling Cotton, 1997 dollars

County	Value of Output $/acre	Value Added $/acre	Wages and Salaries $/acre	Employment # of Jobs/1000 Acres
Fresno	-$1775	-$477	-$294	-16
Kern	-$1614	-$467	-$291	-15
Kings	-$1398	-$403	-$258	-15
Tulare	-$1470	-$411	-$262	-15

Source: DEIM 2002

This section describes the potential effects of EWA water acquisitions through cotton idling.

This scenario includes 182,800 acres of cotton crop idling. DWR's DEIM calculates these results using per acre estimates described in Table 11-38. Table 11-39 presents these dollar amount as a percentage loss to the baseline values.

- Idling 70,500 cotton acres in Fresno County would result in a $125.1 million total decrease in value of output, a $33.6 million decrease in value added, a $20.7 million decrease in wages and salaries, and a loss of 1,127 jobs.

- Idling 49,300 cotton acres in Kern County would result in a $79.6 million total decrease in value of output, a $23.0 million decrease in value added, a $14.4 million decrease in wages and salaries, and a loss of 752 jobs.

- Idling 44,500 cotton acres in Kings County would result in a $62.2 million decrease in total value of output, a $17.9 million decrease in value added, an $11.2 million decrease in wages and salaries, and a loss of 668 jobs.

- Idling 18,500 cotton acres in Tulare County would result in a $27.2 million total decrease in value of output, a $7.6 million decrease in value added, a $4.8 million decrease in wages and salaries, and a loss of 276 jobs.

This cotton idling scenario would reduce value of output, value added, wages and salaries, and employment in Fresno, Kern, and Tulare Counties by less than one half of one percent. In Kings County, the effects would range from 0.8 percent to 1.6 percent of the baseline values. Section 11.2.5.2.3 addresses effects on local economies.

Table 11-39
Economic Effects of Alternative Cotton Idling Actions in Export Service Area Counties

Cotton Idling Action				Percent Economic Effect[2]			
County	Total Cotton Acres[1]	Maximum Idled Acres	% of Total Acres Idled	Value of Output	Value Added	Wages and Salaries	Employment
Fresno	352,880	70,500	20.0%	-0.41%	-0.19%	-0.22%	-0.28%
Kern	246,616	49,300	20.0%	-0.33%	-0.16%	-0.19%	-0.25%
Kings	222,543	44,500	20.0%	-1.62%	-0.80%	-0.88%	-1.40%
Tulare	92,680	18,500	20.0%	-0.22%	-0.11%	-0.14%	-0.16%
Total	914,719	182,800	20.0%				

Source: DEIM 2002

(1) The figures representing total cotton acres within the counties are based on a five-year average to take into account any recent land trends in cotton production. The data is taken from the County Agricultural Commissioners Reports from 1995 to 1999.
(2) Percentages represent reductions to baseline values.

The results in Table 11-39 are predicated on the water prices shown in Table 11-34. Actual water prices will vary from year to year as hydrologic conditions and conditions in agricultural markets change; however, the results of the regional analysis are not very sensitive to water price. For example, if the price of water in Kings County is increased 50 percent to $180 per acre-foot, the adverse effect on output is reduced from $1,398 per acre to $1,261 per acre, or about 10 percent. The adverse effect is not substantially reduced. This sensitivity analysis also supports the premise that, although increases in water transfer revenue increase farmer spending and offsets some of the economic loss from idling land, the amount of offset would not eliminate the negative effect from idling land.

11.2.5.2.3 Local Analysis

The following is a qualitative discussion of local third party economic effects. Third-party economic effects in the Export Service Area would be similar to those in the Upstream from the Delta Region. The majority of cotton fields in the region are in western Kern County, in the Tulare Lake Basin in Kings and Tulare Counties and in western Fresno County. Crop idling would affect the small, rural communities in this area, where agriculture is the major source of income and employment.

Most of the agricultural companies in the area depend on volume for revenue. A reduced volume of cotton production would cause cotton gins to lose revenues and would result in a decrease in employment opportunities. Although the loss of gross revenue and jobs may be small relative to the total economic activity in a region, that loss would be concentrated in just one industry – cotton. The infrastructure that supports the region's cotton industry could be reduced in the long run, due to the ongoing land-idling operations of the EWA program, land retirement, and other factors that may idle cotton land.

Third-party economic effects would occur locally. Businesses directly involved with cotton production and processing, such as seed and fertilizer supply stores and cotton gins, would lose both revenue and employment. Local spending would decrease. These effects would adversely affect the business owners, whose revenues could decrease, and the employees, who could lose their jobs.

Farmers and landowners would increase their net revenue by selling water to the EWA, as described above. Presumably, farmland owners would spend some of their increased net revenues in the local economy. This effect could potentially partially offset the decrease in local spending by the third parties described above. Analysis of the effects of water price changes suggests that the spending boost provided by increased net revenues from water transfers would not offset the negative effects from land idling.

11.2.5.3 Effects on Tax Revenue

EWA acquisition of water through crop idling could change county property tax revenues.

Local governments are dependent on property tax revenues for financing of local services and education. Water acquisitions via crop idling could affect property taxes if they affect property values. For landowners of irrigated land, water transfers represent a potential source of profits. Theoretically, if a farmer voluntarily transfers water, then expected profits from the sale of water must exceed the profits expected from farming the land. The opportunity provided by voluntary transfers increases long-run average economic returns to irrigated land. Therefore, property values should increase. Subsequently, property tax revenues to the county would also increase.

One economic issue associated with land idling is the potential for Open Space Subvention Act revenue losses to be caused by a reclassification of "Prime" land to non-prime land, as defined under the Williamson Act. County tax revenue could potentially decrease if land idling results in the State reclassifying lands enrolled in the Williamson Act to lower levels. Under the Open Space Subvention Act, county governments receive subvention payments to replace lost property tax revenues from lands enrolled in the Williamson Act. Lands classified as prime land under the Williamson Act qualify for a $5 per acre subvention payment, and lands other than prime farmland qualify for a $1 per acre subvention payment.

In order to determine whether crop idling by the EWA would alter the classification of prime farmland, it is important to consider the land use and production value during the prior years of the particular parcel to be idled (Bryant 2003). Cropland could be downgraded from the prime category if the land was idled for 3 or more of the last 5 years. The EWA Project Agencies would consider the cropping patterns' history during the previous 5 years of the parcel of land before purchase. Chapter 13 identifies mitigation measures that propose limits for EWA crop-idling purchases to avoid changing the classification of lands under the Williamson Act. Therefore, with this mitigation measure in effect, the decrease in subvention payments to county governments would not likely occur.

EWA acquisition of water though crop idling could cause a decrease in sales tax revenue to the county.

Retail sales at agricultural supply stores and certain other retail outlets would decrease because of land idling. Decreased sales would reduce sales tax revenue returned to the county. Sales taxes are roughly 7 percent of retail sales, and one percent is returned directly to the county. The effect of a 1-acre reduction of rice in the counties in the Upstream from the Delta Region on sales tax revenue returned to the county would range from $0.93 to $1.75 (DWR 2002). DWR (2002) found that a 1-acre reduction of upland cotton in Colusa County would decrease sales tax revenue returned to the county by about $0.98 (DWR 2002). Effects would occur only in years when the crop idling actions take place, and effects would be less when less land is idled.

11.2.5.4 Effects on Costs Associated with Groundwater

EWA acquisition of water through groundwater substitution and groundwater purchase in the Upstream from the Delta Region and Export Service Area could cause a decline in groundwater levels and increase groundwater extraction costs.

Section 6.2.2 in the Groundwater Resources chapter defines groundwater-level declines to be significant if there is a substantial long-term decline in groundwater levels that results in water-level declines exceeding those experienced historically, or a net reduction in groundwater levels that exceeds basin management objectives established for the basin in question, resulting in adverse third-party and/or environmental effects. Third party effects may include an increase of energy costs to users, as more energy is needed to extract the groundwater at a greater depth. Well yields may also diminish, adversely affecting water supply to third-party users. Decreased yields may cause the third-party user a reduction in crop yield or further increase production costs if farmers choose to apply optimal amounts of irrigation water to retain high yields.

The groundwater mitigation measures are designed to reduce adverse effects by requiring a preliminary review of the existing local groundwater levels and extraction wells prior to the transfer. These measures, however, do not guarantee that all adverse effects would be avoided and further stipulate that all sellers have a monitoring and mitigation program to address adverse effects. These programs provide assurances that substantially adverse effects resulting from groundwater transfers to the EWA Program would be identified, assessed, and mitigated for at a local level.

Furthermore, the groundwater mitigation measures recommend that each local mitigation program include a financial strategy for funding appropriate mitigation measures. Mitigation costs may encompass, but are not inclusive to the following: (1) costs associated with providing an alternative water supply if well yields substantially decrease or pumping curtailment is required until natural recharge

raises water levels, (2) costs of lowering pumping bowls or deepening wells, and (3) reimbursement for substantial increases in pumping costs that are incurred by third party groundwater users. Expenses incurred from groundwater effects are the responsibility of the local seller, unless an alternative agreement has been made between the seller and purchasing agency.

Groundwater storage by the EWA agencies would increase groundwater levels, resulting in less pumping energy required to extract water for third-party users. Raising groundwater levels would reduce extraction costs.

11.2.5.5 Effects on Water Transfer Market Prices

EWA water transfers could reduce the availability of water transfers and, by increasing demand increase the price and cost of water transfers for other water users. In economic theory, if the demand for water transfers increases, the price might also increase. The extent to which price might increase with EWA purchases depends on the size of the transfer and the shape of the water transfer supply function.

This type of effect could be important for other water users, who sometimes buy water to augment their supplies, and for water acquisition programs that buy water for environmental purposes. In particular, the CVP Level 4 refuge water supply program buys water to meet requirements in CVPIA Section 3406(d)(2).[15] If water prices were increased, and the budget for purchasing Level 4 supplies were fixed, then less refuge water supply could be purchased. Water transfer market price effects could affect all EWA regions. Potential price increases to municipal water districts, such as Metropolitan Water District, could be transferred to consumers in Southern California through higher water rates.

In recent years, more buyers and sellers have participated in water transfers. Water demand in cities is growing and some supplies have been reduced by environmental and administrative decisions. These factors have caused water agencies to seek new sources of water to meet their demands. At the same time, the amount of water transfers for environmental purposes has increased.

Table 11-40 summarizes water transfer volumes purchased for various uses since 1995.

[15] Chapter 1 and Chapter 2 discuss requirements of Refuge Level 4 water demands.

Table 11-40
Water Purchases by Type of End User
(Acre-feet)

Year	Total	Environmental	M&I	San Joaquin Valley Farmers	Other Farmers	Mixed Purpose
1995	511,904	111,899	112,667	279,331	8,007	0
1996	825,185	72,216	220,308	503,548	29,113	0
1997	1,037,808	293,000	191,402	439,322	14,084	100,000
1998	554,411	61,748	215,956	211,029	65,678	0
1999	1,078,379	229,459	173,988	556,980	75,592	45,360
2000	1,281,305	276,290	169,826	507,841	94,146	233,202
2001	1,257,117	445,543	261,922	388,401	112,776	48,475

Source: Public Policy Institute of California 2002

Table 11-40 shows that environmental transfers were not a large share of total water transfers in the market from 1995 to 2000. In 2001, the share of environmental transfers increased to about one-third of all transfers. Not all the 2001 environmental transfers were EWA acquisitions (PPIC 2002).

The discussion and conclusions below are based on the short history of the EWA and the water transfer market in California. The EWA has been active in the water transfers market only since 2001. In 2001, EWA Project Agencies paid prices ranging from $75 to $100 Upstream from the Delta Region and $138 to $360 in the Export Service Area (Water Transfers Office 2003a). In 2002, EWA Project Agencies paid $75 for water transfers in the Upstream from the Delta Region and $181 in the Export Service Area (Water Transfers Office 2003).

In the future, the EWA would not likely account for a large share of total water transfers in most years. Other buyers, especially agricultural users, typically buy more water, and M&I buyers are likely to be more important in the future. In some years, if and when EWA purchases up to 600,000 AF, the EWA could account for a larger share of the water transfer market. During these years, the EWA could influence water prices.

The water transfer supply function describes the relationship between price and quantity of water transfers supplied. It shows how much more water would be provided by sellers as the price of water increases. Supply elasticity is the percentage increase in quantity of a good or service supplied divided by a small percent change in price offered for that good or service. For an inelastic supply, price does not have much effect on quantity supplied. A 1 percent increase in price would increase the quantity supplied by a smaller percentage. For an elastic supply, price has a relatively large effect on quantity supplied. The same 1 percent increase in price would increase the amount of water transferred by more than 1 percent. If supply is elastic, increases in transfer demand have little effect on price because more water is readily made available for sale at the going price.

Two factors are very important in determining the elasticity of water transfer supply. One factor, which pertains to water transfers from idling land, is the amount and quality of agricultural land that could be idled. If the amount is large and the quality is very similar, then a large amount of land would give up a similar per-acre net return by participating in water transfers and the water transfer supply would be relatively elastic. In California, this factor should contribute to a relatively elastic water transfer supply. California has large amounts of similar rice and cotton land, relative to the transfer market size, and EWA water acquisitions would only idle up to 20 percent of that land.

The second factor pertains to water transfers from surface or groundwater. Supply is more elastic if more surface and groundwater can be supplied economically in response to higher prices. In general, the amount of groundwater and surface water capacity is also large relative to the water transfer market.

In economic theory, long-run supply is more elastic than short-run supply because some adjustments that sellers make to respond to higher prices take time. For example, investments to develop new supplies or conserve water take time to plan and implement. The amounts of intentional groundwater recharge and other new supplies available for transfer are growing, in part, because buyers are willing to pay for them, but these improvements tend to lag behind the demand for them.

Figure 11-5a illustrates examples of demand and supply curves in the water transfers market. If demand increases, the demand curve would shift to the right, as shown on Figure 11-5b, resulting in an increase in price. In this example, supply is elastic so the increase in price is small relative to the increase in demand.

The factors potentially affecting long-run supply discussed above would result in shift of the supply curve to the right and make it even flatter – more elastic. More water supply would shift the supply function and drive down the price of transfers.

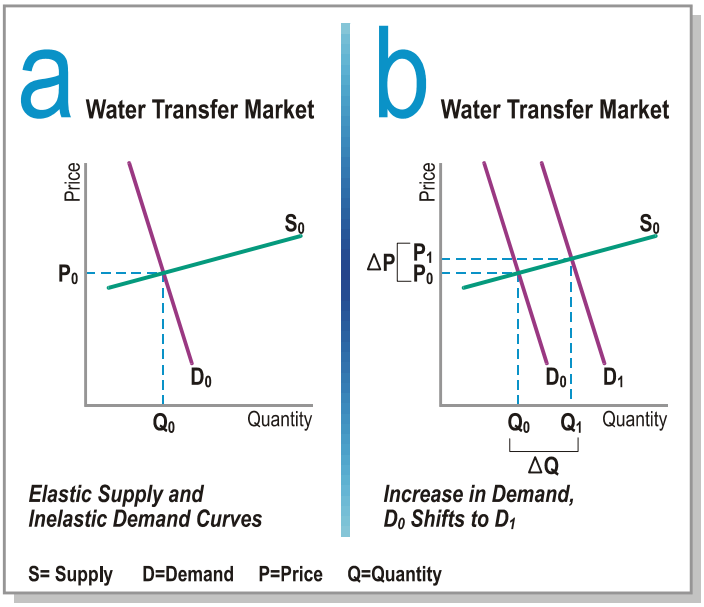

Figure 11-5
Supply and Demand in the Water Transfers Market

The supply function also shifts from year to year as underlying factors change. Hydrologic conditions and agricultural prices are both important underlying factors. These factors could affect water transfer prices much more than water transfer demand. The difference in available supply between a wet year and a dry year

amounts to millions of acre-feet. Dry hydrologic conditions probably had an upward influence on water prices in 2001. Small changes in agricultural prices can also have a large effect on water transfer supply because net returns in farming are very responsive to agricultural prices.

The water purchases by EWA Project Agencies in 2001 did not appear to increase water transfer prices. Prices in 2002 for major water transactions actually decreased on average from 2001 (Stratecon Inc. 2003). However, other factors such as the location of water purchases may have been important in the reduction of prices from 2001 to 2002.

The water transfer price data in Figure 11-4 and the amount of water purchases as shown in Table 11-41 suggest that water transfer prices are not determined by the amount of water purchased. Rather, water transfer prices are more closely related to underlying hydrologic conditions and conditions in agricultural markets.

The discussion above suggests that (1) water transfer supply may be fairly elastic in California, and (2) hydrologic conditions and agricultural prices have more influence on water transfer prices than the amount of water transfer demand.

In summary, EWA water acquisitions could increase water transfer prices; however, effects in a typical water year would not likely be substantial. The water transfer market in California is developing, so the amount of increase that may occur under different amounts and locations of water purchases is very uncertain. Several factors are important when considering price effects caused by EWA acquisitions:

1. Whether the EWA accounts for a large share of the water transfer market in most years.

2. Elasticity of supply in the water transfer market means that increasing demands would not necessarily have much upward effect on prices.

3. Variability in water transfer prices over time might have little to do with the amount of water bought by the EWA or other buyers. Rather, hydrologic conditions and agricultural prices probably have more effect on the price of water transfers. These factors are not controlled by participants in the market.

For reasons discussed above, the amount of price effect and its subsequent adverse effect cannot be predicted at this time. In particular, the amount and location of future water transfers are not known.

11.2.5.6 Effects of Multi-Year Water Transfers

EWA Project Agencies could negotiate multi-year water transfers with willing sellers. The project description specifies that an EWA acquisition would not result in idling of more than 20 percent of available rice or cotton acreage in a county or region. The effects on value of output, value added, wages and salaries, and employment

described above represent annual effects. A multi-year purchase would produce some economic effects above the sum of effects for the individual years. Fixed expenses for farmers would change some during multi-year water transfers. For example, a 1-year transfer would probably not affect a farmer's decision to invest in machinery, but a multi-year transfer may.

Conversely, farmers participating in multi-year transfers would plan on returning the land to production after the transfer. Therefore, some fixed expenses might be deferred, but not avoided. To the extent that capital and replacement expenses would be deferred and not canceled, long-run effects of multi-year transfers at the farm level would be about the same as annual transfers.

In the long-run, a multi-year water purchase should not produce any economic effects in the off-farm agricultural industry above those that would occur annually. DEIM assumes that fixed expenses in farm-related businesses change as they adjust to new, long-run level of output. The infrastructure that supports the region's agricultural industry could be reduced in the long-run, but, relative to a scenario with annual transfers only, additional off-farm reduction occurs only if farms engaged in multi-year transfers decide to cancel (not defer) their capital and replacement expenses.

11.2.6 Environmental Consequences/Environmental Impacts of the Fixed Purchase Alternative

The Fixed Purchase Alternative specifies purchases of 35,000 acre-feet from the Upstream from the Delta Region and 150,000 acre-feet from the Export Service Area. While the amounts in each region are fixed, the acquisition types and sources could vary. In this section, the effects of each potential transfer are analyzed to allow the EWA Project Agencies maximum flexibility when negotiating purchases with willing sellers. These transfers are the same actions as those described in the Flexible Purchase Alternative, but the amounts are limited by the total acquisition amount in each region (35,000 acre-feet from the Upstream from the Delta Region and 150,000 acre-feet from the Export Service Area). As in the Flexible Purchase Alternative, crop idling and groundwater substitution would be EWA actions with potential regional and agricultural economic effects; and all water acquisitions could affect prices in the water transfer market.

11.2.6.1 Crop Idling

Crop idling acquisitions under the Fixed Purchase Alternative would have the potential to idle approximately 15,000 acres of rice in the Upstream from the Delta Region in Glenn, Colusa or Yolo Counties and 10,600 acres in Placer, Sutter or Butte Counties. The difference in acreages among the counties is caused by conveyance and storage issues in Lake Shasta and the Sacramento River (see Chapter 2). A total of 65,000 acres of cotton would be idled in the Export Service Area to acquire the total 150,000 acre-feet. The effects described in Section 11.2.5, Flexible Purchase Alternative, represent the effects on regional, county, and local economies for maximum land idling actions as determined by the 20 percent crop idling measure of

the project description. The Fixed Purchase Alternative is also limited by the 20 percent crop-idling measure. The Fixed Purchase Alternative analysis assumes that it would be possible to purchase the entire 35,000 acre-feet or 150,000 acre-feet of water in a single county, if the 20 percent of baseline acreage is not reached first. This assumption is made to allow the EWA agencies to purchase available water in a county. It would be unlikely that the EWA agencies would acquire the entire 35,000 acre-feet or 150,000 acre-feet from a single county, and this analysis is only demonstrating that it could be possible. However, even though it is possible, the EWA will try to spread purchases across a larger area.

EWA acquisition of water via crop idling of would increase net revenues to individual farmland owners participating in the EWA.

Effects to farmland owners would be similar to those described under the Flexible Purchase Alternative. Farmland owners who participate in the EWA would receive higher expected net revenues from the sale of water than what they would receive from farming the land.

EWA acquisition of water via crop idling would decrease net revenues to some tenant farmers whose landowners choose to participate in the EWA.

Effects to tenant farmers under the Fixed Purchase Alternative would be the same as described in the Flexible Purchase Alternative.

EWA acquisition of water via crop idling of rice acres in the Upstream from the Delta Region would decrease the total value of output, value added, wages and salaries, and employment in the region.

In the Upstream from the Delta Region, it would be possible to acquire the entire 35,000 acre-feet of water in a single county if 15,000 acres (or 10,600 acres in Placer, Sutter, or Butte Counties) were below the 20 percent crop idling measure. Table 11-31 (Section 11.2.5) describes the maximum rice idling actions in each county in the Upstream from the Delta Region. If the acres of rice idled under the Flexible Purchase Alternative were greater than 15,000 acres (or 10,600 acres), then the Fixed Purchase Alternative would idle only 15,000 acres (or 10,600 acres) as the maximum EWA action. If the maximum acres idled were less than 15,000 acres (or 10,600 acres) because of 20 percent crop idling limits, then the Fixed Purchase Alternative would include the same acreage as the Flexible Purchase Alternative as the maximum EWA action. Table 11-41 summarizes the rice acres idled in the Fixed Purchase Alternative. (Values associated with the percentages are presented in Table 11-43.)

Table 11-41
Economic Effects of Rice Idling under the Fixed Purchase Alternative
Upstream from the Delta Region

	Rice Idling Action			Percent Economic Effect[3]			
County	Total Rice Acres[1]	Maximum Idled Acres[2]	% of Total Acres Idled	Value of Output	Value Added	Wages and Salaries	Employment
Butte	95,120	10,600	11.1%	-0.47%	-0.30%	-0.28%	-0.33%
Colusa	132,338	15,000	11.3%	-2.74%	-2.07%	-2.53%	-2.50%
Glenn	83,777	15,000	17.9%	-1.87%	-1.74%	-1.91%	-2.80%
Placer	16,379	3,280	20.0%	-0.04%	-0.03%	-0.03%	-0.05%
Sutter	96,722	10,600	10.9%	-0.61%	-0.43%	-0.49%	-0.61%
Yolo	23,822	4,770	20.0%	-0.14%	-0.09%	-0.08%	-0.11%
Maximum acres available	448,158	59,250	13.2%				

Source: DEIM 2002

(1) The figures representing total rice acres within the counties are based on a five-year average to take into account any recent land trends in rice production. The data is taken from the County Agricultural Commissioners Reports from 1995 to 1999.

(2) In order to avoid limiting potential land idled a single county, the Fixed Purchase Alternative analysis assumes that it is possible to purchase the entire 35 TAF from one county. Therefore, these are the maximum acreages available for the Fixed Purchase Alternative in each county. It is important to note, EWA agencies only seek to acquire maximum 35 TAF water and would not likely acquire all water in an individual county.

(3) These percentages represent reductions to baseline values.

EWA acquisition of water via crop idling of cotton acres in Fresno, Kern, Kings, and Tulare Counties would decrease total value of output, value added, wages and salaries, and employment in each county.

The Export Service Area analysis for the Fixed Purchase Alternative uses a similar approach as the Upstream from the Delta Region. In the Export Service Area, it would be possible to acquire the entire 150,000 acre-feet of water in an individual county if 65,000 acres of cotton in the county were below the 20 percent crop idling measure. Table 11-39 describes the maximum cotton-idling actions in each county. Twenty percent of cotton acreage was more than 65,000 acres as in Fresno County, so the Fixed Purchase Alternative could include all 65,000 acres as the maximum EWA action in that county. In the other counties, 20 percent of cotton acreage was less than 65,000 acres, so the Fixed Purchase Alternative included only 20 percent of cotton acreage as the maximum EWA action for the county. Table 11-42 shows the maximum cotton acres idled in each county in the Fixed Purchase Alternative. Values associated with the percentages are presented in Table 11-43.

Table 11-42
Economic Effects of Cotton Idling under the Fixed Purchase Alternative
Export Service Area

Cotton Idling Action				Percent Economic Effect[3]			
County	Total Cotton Acres[1]	Maximum Idled Acres[2]	% of Total Acres Idled	Value of Output	Value Added	Wages and Salaries	Employment
Fresno	352,880	65,000	18.4%	-0.38%	-0.18%	-0.20%	-0.26%
Kern	246,616	49,300	20.0%	-0.33%	-0.16%	-0.19%	-0.25%
Kings	222,543	44,500	20.0%	-1.62%	-0.80%	-0.88%	-1.40%
Tulare	92,680	18,500	20.0%	-0.22%	-0.11%	-0.14%	-0.16%
Maximum acres available	914,719	177,300	19.4%				

Source: DEIM 2002

(1) The figures representing total cotton acres within the counties are based on a five-year average to take into account any recent land trends in cotton production. The data is taken from the County Agricultural Commissioners Reports from 1995 to 1999.

(2) In order to avoid limiting potential land idled a single county, the Fixed Purchase Alternative analysis assumes that it is possible to purchase the entire 150 TAF from one county. Therefore, these are the maximum acreages available for the Fixed Purchase Alternative in each county. It is important to note, EWA agencies only seek to acquire maximum 150 TAF water, or 65,000 acres and would not likely acquire all water in an individual county.

(3) Percentages represent reductions to baseline values.

EWA acquisition of water through crop idling could change county property and sales tax revenues.

County tax revenues would be less affected under the Fixed Purchase Alternative because less land would be idled. Agricultural land use mitigation measures continue to apply under the Fixed Purchase Alternative; therefore, property tax and subvention revenues would not be reduced. Agricultural and retail stores would lose some sales, so sales taxes would be reduced though not as much as under the Flexible Purchase Alternative.

11.2.6.2 Groundwater Pumping Costs

EWA acquisition of water through groundwater substitution and groundwater purchase in the Upstream from the Delta Region and groundwater substitution, groundwater purchase, and groundwater storage in the Export Service Area could cause a decline in groundwater levels and increase groundwater extraction costs.

Groundwater acquisitions would be further limited under the Fixed Purchase Alternative, relative to the Flexible Purchase Alternative. Groundwater transfers to the EWA Program would be identified, assessed, and mitigated for at a local level. Furthermore, if necessary, a local mitigation program would include a financial strategy for funding appropriate mitigation measures. This would protect users from any increases in energy or pumping costs.

11.2.6.3 Water Transfer Market Prices

EWA water transfers could reduce the availability of water transfers and increase the price and cost of water transfers for other water users.

Under the Fixed Purchase Alternative, EWA Project Agencies would limit water acquisitions. EWA would also not be as large of a participant in the market. Therefore, EWA would have less demand for water transfers and, therefore, less effect on the price of water.

11.2.7 Comparative Analysis of Alternatives

This chapter has thus far analyzed the economic effects of potential EWA water transfers which represent the "worst-case scenario" that could occur if all acquisitions were made in a single year. This approach ensures that all effects of transfers are included, and provides the EWA Project Agencies the flexibility to choose transfers that may be preferable in a given year. The EWA, however, would not actually purchase all of this water in the same year. The following paragraphs provide information about how the EWA would more likely operate in different year types.

Under the No Action/No Project Alternative, historic farming practices would continue in wet and dry years. Farmers may choose to idle more land in dry years, relative to wet years, because of the decrease in water supply for irrigation. Agricultural crop prices would also continue to fluctuate in dry and wet years, resulting in changes in the cropping pattern.

11.2.7.1 Upstream from the Delta Region

In the Upstream from the Delta Region, the Fixed Purchase Alternative would be limited to a maximum acquisition of 35,000 acre-feet from all sources of water. In most years, this amount could be obtained from stored reservoir water purchases. In those years when surface water assets were not available (in part or in total), the EWA agencies would acquire water first from groundwater substitution and/or groundwater purchase, followed by crop idling. The Fixed Purchase Alternative would therefore not likely involve acquisition of water from groundwater substitution or crop idling. Therefore, crop idling effects on local, county, and regional economies, sales tax revenue, and property tax revenue would be minimal, and groundwater pumping costs would likely not increase.

The Flexible Purchase Alternative could involve the purchase of up to 600,000 acre-feet of water from all sources in the Upstream from the Delta Region. EWA agencies would prefer to purchase water from upstream sources because the water would be generally less expensive. The amount that could be purchased would be limited by the excess capacity of the Delta export pumps to move the water to export areas. During wet years, excess pump capacity may be limited to as little as 50,000 acre-feet of EWA asset water because the pumps primarily would be used to export State and Federal project water to Export Service Area users. During dry years, when there would be less CVP and SWP water available for pumping (and therefore the pumps

would have greater availability capacity), the EWA Project Agencies could acquire up to 600,000 acre feet of water from sources in the Upstream from the Delta Region.

The potential for economic effects in the Upstream from the Delta Region during wet years for the Flexible Purchase Alternative would be very similar to the Fixed Purchase Alternative. During wet years, under both alternatives, acquisitions would most likely be from stored water sources, and groundwater substitution and crop idling would not be exercised. During dry year conditions, however, when the export pumps have greater capacity to move EWA assets, groundwater substitution and crop idling would be utilized for additional EWA acquisitions. Therefore, during dry years, under the Flexible Purchase Alternative, EWA Project Agencies would acquire water through groundwater substitution and crop idling at much greater amounts than would occur under the Fixed Purchase Alternative. Increased groundwater substitution and crop idling in dry years would increase the potential for the Flexible Purchase Alternative to have economic effects.

11.2.7.2 Export Service Area

EWA asset acquisitions in the Export Service Area under the Fixed Purchase Alternative would be limited to 150,000 acre-feet from stored groundwater and crop-idling sources. The EWA agencies would purchase stored groundwater first, then purchase water from crop idling if more is needed. Stored groundwater has finite availability, and 150,000 acre-feet would not likely be available in all years. In years with less stored groundwater availability, EWA agencies would turn to crop idling for the remaining water.

EWA asset acquisitions in the Export Service Area under the Flexible Purchase Alternative would be dependent on the water year type in the Upstream from the Delta Region. Export pump capacity during wet years would limit the ability of the EWA Project Agencies to move assets through the Delta, requiring reliance on greater purchase amounts from export area sources. During wet years, acquisitions within the Export Service Area could involve up to 600,000 acre-feet of assets. Much of this water would be from crop idling; therefore, economic effects related to crop idling of the Flexible Purchase Alternative would likely be greater than for the Fixed Purchase Alternative.

Less water would be purchased under the Fixed Purchase Alternative than the Flexible Purchase Alternative regardless of the hydrologic year. Therefore, effects to the water transfer market under the Fixed Purchase Alternative would be less than the Flexible Purchase Alternative.

Table 11-43 summarizes the economic effects of the Fixed Purchase Alternative and the Flexible Purchase Alternative relative to the Baseline Condition.

Table 11-43
Comparison of Regional and Agricultural Economic Effects of Flexible and Fixed Purchase Alternative Compared to the Baseline Condition

Region	***Asset Acquisition or Management***	***Result***	***Effects[1]***	***Maximum Flexible Purchase Alternative Effects[2][3]***	***Maximum Fixed Purchase Alternative Effect[2][4]***
Upstream from the Delta Region and Export Service Area	Crop Idling	Temporary loss of irrigated production and related economic activity	Decrease net revenue to tenant farmers	Tenant farmers could be worse off if landowner sells water	Tenant farmers could be worse off if landowner sells water
Upstream from the Delta Region and Export Service Area	Crop Idling	Temporary loss of irrigated production and related economic activity	Increase net revenue to farmers/land owners participating in the sale of water to EWA	Increased net revenue to farmers from sale of water	Increased net revenue to farmers from sale of water
Butte	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* rice acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)* 19,000 acres, 20.0% *(2)* $52.8 million, 0.84% *(3)* $20.8 million, 0.55% *(4)* $10.3 million, 0.50% *(5)* 570 jobs, 0.59%	*(1)* 10,600 acres, 11.1% *(2)* $29.4 million, 0.47% *(3)* $11.6 million, 0.30% *(4)* $5.8 million, 0.28% *(5)* 318 jobs, 0.33%
Colusa	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* rice acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)26,460* acres, 20.0%, *(2)* $52.4 million, 4.83% *(3)* $16.6 million, 3.64% *(4)* $9.4 million, 4.46% *(5)* 476 jobs, 4.42%	*(1)* 15,000 acres, 11.3% *(2)* $29.7 million, 2.74% *(3)* $9.4 million, 2.07% *(4)* $5.4 million, 2.53% *(5)* 270 jobs, 2.50%
Glenn	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* rice acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)* 16,750 acres, 20.0% *(2)* $22.3 million, 2.08% *(3)* $9.8 million, 1.94% *(4)* $5.4 million, 2.13% *(5)* 385 jobs, 3.13%	*(1)* 15,000 acres, 17.9% *(2)* $20.0 million, 1.87% *(3)* $8.8 million, 1.74% *(4)* $4.8 million, 1.91% *(5)* 345 jobs, 2.80%
Placer	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* rice acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)* 3,280 acres, 20.0% *(2)* $4.7 million, 0.04% *(3)* $2.1 million, 0.03% *(4)* $1.1 million, 0.03% *(5)* 62 jobs, 0.05%	*(1)* 3,280 acres, 20.0% *(2)* $4.7 million, 0.04% *(3)* $2.1 million, 0.03% *(4)* $1.1 million, 0.03% *(5)* 62 jobs, 0.05%
Sutter	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* rice acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)* 19,340 acres, 20.0% *(2)* $30.2 million, 1.12% *(3)* $12.5 million, 0.78% *(4)* $7.0 million, 0.90% *(5)* 425 jobs, 1.11%	*(1)* 10,600 acres, 10.9% *(2)* $16.6 million, 0.61% *(3)* $6.9 million, 0.43% *(4)* $3.8 million, 0.49% *(5)* 233 jobs, 0.61%
Yolo	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* rice acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)* 4,770 acres, 20.0% *(2)* $11.7 million, 0.14% *(3)* $4.4 million, 0.09% *(4)* $2.5 million, 0.08% *(5)* 110 jobs, 0.11%	*(1)* 4,770 acres, 20.0% *(2)* $11.7 million, 0.14% *(3)* $4.4 million, 0.09% *(4)* $2.5 million, 0.08% *(5)* 110 jobs, 0.11%
Fresno	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* cotton acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)* 70,500 acres, 20.0% *(2)* $125.1 million, 0.41% *(3)* $33.6 million, 0.19% *(4)* $20.7 million, 0.22% *(5)* 1127 jobs, 0.28%	*(1)* 65,000 acres, 18.4% *(2)* $115.4 million, 0.38% *(3)* $31.0 million, 0.17% *(4)* $19.1 million, 0.20% *(5)* 1,038 jobs, 0.26%
Kern	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* cotton acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)* 49,300 acres, 20.0% *(2)* $79.6 million, 0.33% *(3)* $23.0 million, 0.16% *(4)* $14.4 million, 0.19% *(5)* 752 jobs, 0.25%	*(1)* 49,300 acres, 20.0% *(2)* $79.6 million, 0.33% *(3)* $23.0 million, 0.16% *(4)* $14.4 million, 0.19% *(5)* 752 jobs, 0.25%

Table 11-43
Comparison of Regional and Agricultural Economic Effects of Flexible and Fixed Purchase Alternative Compared to the Baseline Condition

Region	***Asset Acquisition or Management***	***Result***	***Effects[1]***	***Maximum Flexible Purchase Alternative Effects[2][3]***	***Maximum Fixed Purchase Alternative Effect[2][4]***
Kings	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* cotton acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)* 44,500 acres, 20.0% *(2)* $62.2 million, 1.62% *(3)* $17.9 million, 0.80% *(4)* $11.2 million, 0.88% *(5)* 668 jobs, 1.40%	*(1)* 44,500 acres, 20.0% *(2)* $62.2 million, 1.62% *(3)* $17.9 million, 0.80% *(4)* $11.2 million, 0.88% *(5)* 668 jobs, 1.40%
Tulare	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduced economic activity indicated by *(1)* cotton acreage *(2)* county output, *(3)* value added, *(4)* wages and salaries and *(5)* employment	*(1)* 18,500 acres, 20.0% *(2)* $27.2 million, 0.22% *(3)* $7.6 million, 0.11% *(4)* $4.8 million, 0.14% *(5)* 276 jobs, 0.16%	*(1)* 18,500 acres, 20.0% *(2)* $27.2 million, 0.22% *(3)* $7.6 million, 0.11% *(4)* $4.8 million, 0.14% *(5)* 276 jobs, 0.16%
Upstream from the Delta Region and Export Service Area	Crop Idling	Temporary loss of irrigated production and related economic activity	Reduce sales tax revenue to the county	Sales tax revenue would decrease from lower sales in agricultural retail stores.	Sales tax revenue would decrease from lower sales in agricultural retail stores.
Upstream from the Delta Region and Export Service Area	Crop Idling	Temporary loss of irrigated production and related economic activity	Change property tax revenue to the county and reduced subvention payments	Property taxes would increase from higher land values and decrease from change in land classification under Williamson Act.	Property taxes would increase from higher land values and decrease from change in land classification under Williamson Act.
Upstream from the Delta Region and Export Service Area	Groundwater Substitution, Purchase and Storage	Decline in groundwater levels	Increase in groundwater extraction costs	All effects resulting from groundwater transfers would be identified assessed and mitigated for at a local level.	All effects resulting from groundwater transfers would be identified assessed and mitigated for at a local level.
Upstream from the Delta Region, Export Service Area, Delta Region	All	Changes in water transfer prices	Increase in water transfer market prices	Effect would not likely be substantial in a typical water year.	Effect would not likely be substantial in a typical water year.

1) The individual effects, crop acreage, output, value added, wages and salaries, and employment, are hereon referred to by number corresponding to the effect in subsequent columns.
(2) Numbers are presented as reduction in county acreage, total value of output, value added, wages and salaries and employment, followed by percent change to baseline conditions.
(3) The Flexible Purchase Alternative effects presented in the table are based on the county analysis described in section 11.4.6.1 and section 11.4.6.2, and all water comes from idling
(4) The Fixed Purchase is based on the assumption that 50,000 acre-feet of water is to be acquired in the Upstream from the Delta Region and 150,000 acre-feet of water is to be acquired in the export services areas, and all water comes from idling.

11.2.8 Cumulative Effects

11.2.8.1 Crop Idling

11.2.8.1.1 Upstream from the Delta Region

The timeframe for the EWA cumulative analysis extends through 2007. Water transfer programs that also consider crop idling in the Upstream from the Delta Region as a water acquisition method include the Dry Year Purchase Program, the Drought Risk Reduction Investment Program (DRRIP), the CVPIA Water Acquisition Program (WAP) and the CALFED Environmental Water Program (EWP). Transfers negotiated between CVP and SWP contractors and other water users, such as the Forbearance Agreement with Westlands Water District and the recent crop idling acquisition by Metropolitan WD from water agencies upstream from the Delta, are considered part of the Dry Year Program. Chapter 22 provides further explanation of the framework of the cumulative analysis and a summary of the programs considered.

Crop idling in each of these programs is on a voluntary and usually annual basis. Farmers can choose to offer their water for sale to any of the above programs during any season that the programs are in operation, subject to the conditions specified by the programs. The farmers can then decide to resume planting in the subsequent season. The Flexible Purchase Alternative analysis describes the economic effects of idling 20 percent of rice or cotton acres under the EWA on a yearly basis, both in the region and individual counties.

Under the cumulative condition, at the time of the water acquisition, the EWA agencies would consider other reasonably foreseeable transfers by all water transfer programs when determining where to acquire water through crop idling. EWA agencies would then only purchase water from idling 20 percent of the rice land in a county, where this 20 percent would include the other, reasonably foreseeable transfers. If other water acquisition programs purchase more water through crop idling resulting in greater than 20 percent of rice acreage, those programs would be responsible for meeting Water Code requirements and addressing the subsequent cumulative effect. Table 11-44 presents the maximum rice idling acreages by county under 1995 to 1999 economic conditions.

Table 11-44 Acres of Rice Idled under Cumulative Condition	
Upstream from the Delta Region	**Acres idled under Cumulative Condition**
Butte	19,000 acres
Colusa	26,460 acres
Glenn	16,750 acres
Placer	3,280 acres
Sutter	19,340 acres
Yolo	4,770 acres
Total	89,600 acres

Source: DEIM 2002

Land use mitigation measures (discussed in Chapter 13) would limit EWA agencies from purchasing water through crop idling that would affect existing land classifications.

11.2.8.1.2 Export Service Area

Programs that consider crop idling in Export Service Areas cumulatively in conjunction with the EWA include the Dry Year Purchase Program, DRRIP, and the CVPIA WAP. Chapter 22 provides further explanation of the framework of the cumulative analysis and a summary of the programs considered. There are some farmland idling or retirement programs that are not coordinated with the EWA in the Export Service Area.

Under the cumulative condition, at the time of the water acquisition, the EWA agencies would consider other reasonably foreseeable transfers by all water transfer programs when determining where to acquire water through crop idling. EWA agencies would then only purchase water from idling 20 percent of the cotton land in a county, where this 20 percent would include the other, reasonably foreseeable transfers. If other water acquisition programs purchase more water through crop idling resulting in greater than 20 percent of cotton acreage, those programs would be responsible for meeting Water Code requirements and addressing the subsequent cumulative effect. Table 11-45 presents the maximum crop idling acreages by county under 1995 to 1999 economic conditions.

Table 11-45 Acres of Cotton Idled under Cumulative Condition	
Export Service Area County	**Acres Idled under Cumulative Condition**
Fresno	70,500 acres
Kern	49,300 acres
Kings	44,500 acres
Tulare	18,500 acres
Total	182,800 acres

Source: DEIM 2002

The cumulative analysis also considers the Westlands Global Land Settlement Program. The program proposes to retire 200,000 acres of cropland in the Westlands Water District in western Fresno and Kings Counties. Currently, the program does not specify the types and locations of cropland intended for retirement. Westlands Water District issued a policy statement indicating that all sales would be voluntary and third party effects must be identified and addressed. Implementation of this program would change the baseline level of cropland available for idling for EWA Project Agencies. In this instance, EWA Project agencies would not purchase water via crop idling in areas where idling is already larger than historically normal. EWA would not acquire water from crop idling within an area with close economic ties to Westlands Water District until the local agricultural economy has adjusted to the Retirement program.

11.2.8.2 Groundwater Pumping Costs

Water purchases via groundwater substitution by other water acquisition programs, in addition to the EWA, would result in further declines of groundwater levels and higher extraction costs for third-party users. The EWA would continue to implement its groundwater mitigation measures.

11.2.8.3 Water Transfer Market

Growing environmental, municipal and agricultural needs are increasing the demands for water transfers and expanding the water transfers market. Any local or government-sponsored transfer program would contribute to the cumulative condition. More participants in the market might drive up the price of transfers. Increased prices should increase the long-run supply of water for transfer.

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